PRECONSTRUCTION REVIEW AND REVISED FINAL

DETERMINATION/STATEMENT OF BASIS

ON THE APPLICATION OF

EAST KENTUCKY POWER COOPERATIVE, INC.

HUGH L. SPURLOCK GENERATING STATION

TO CONSTRUCT AND OPERATE A COAL-FIRED ATMOSPHERIC

CIRCULATING FLUIDIZED BED ELECTRIC GENERATING BOILER

Located on Route 8 in Maysville, Mason County, Kentucky

Review and Analysis By:

Koorosh Farhoudi

AFS NUMBER	: 21-161-00009	SIC CODE	: 4911
REGION	: Frankfort	COUNTY	: Mason
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DIVISION FOR AIR QUALITY

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

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1. EXECUTIVE SUMMARY

East Kentucky Power Cooperative, Inc. has submitted a permit application to construct and operate a coal-fired steam electric generating boiler at its existing Hugh L. Spurlock Generating Station, located in Maysville, Kentucky. The proposed boiler will be a 2500 mmBTU/hr coal-fired atmospheric circulating fluidized bed (CFB) combustion unit which is to operate with a total nominal capacity of 270 megawatts (MW). The project is considered a major modification to an existing major source as defined in Kentucky State Regulation 401 KAR 51:017 (40 CFR 52.21), Prevention of Significant Deterioration (PSD) of air quality, with emissions of particulates, sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), beryllium, and sulfuric acid mist in excess of the significant emission rates as specified in Regulation 401 KAR 51:017, Section 22.

The plant does belong to one of the 28 major source categories listed in the PSD regulation, 401 KAR 51:017, because the CFB will be used as an indirect heat exchanger to produce electricity. The source will be located in a county classified as "attainment" or "unclassified" for each of these pollutants pursuant to Regulation 401 KAR 51:010, Attainment status designations. Consequently, the proposed facility meets the definition of a major stationary source and is subject to evaluation and review under the provisions of the PSD regulation for all these pollutants. A PSD review involves the following six requirements:

1. Demonstration of the application of Best Available Control Technology (BACT).
2. Demonstration of compliance with each applicable emission limitation under Title 401 KAR Chapters 50 to 65 and each applicable emissions standard and standard of performance under 40 CFR 60, 61, and 63.
3. Air quality impact analysis.
4. Class I area impact analysis.
5. Projected growth analysis.
6. Analysis of the effects on soils, vegetation and visibility.

Additionally, this source is subject to Title V and Title IV Phase II Acid Rain permitting, as well as PSD permitting. The Title V permitting procedures are within State Regulation 401 KAR 52:020, Permits and Federal Regulation, 40 CFR Part 70. The Title IV permitting procedures are within State Regulation 401 KAR 52:020, Permits, 401 KAR 52:060, Acid Rain Permit, and Federal Regulation 40 CFR part 76. This proposal represents the proposed PSD/Title V permit and the proposed Title IV Phase II Acid Rain permit. The final determination is also provided as a statement of basis for the Title V permit. This review demonstrates that all regulatory requirements will be met and includes a proposed permit which establishes the enforceability of all applicable requirements.

Since this review demonstrates that all applicable PSD, NSPS, NSR, and air toxic requirements will be met, a final determination has been made that the proposed permit should be issued as conditioned.

2. BACKGROUND

A construction permit application was received from East Kentucky Power Cooperative on April 24, 2001, and was considered complete by the Kentucky Division for Air Quality on February 8, 2002. This application is for the construction and operation of a 2500 mmBTU/hr coal-fired atmospheric circulating fluidized bed (CFB) boiler at the existing Hugh L. Spurlock Generating Station. All the information used in the determination of this review was derived from the application.

The correspondence chronology for this project is:

Information Requested	Date Requested	Information Received	Date Received
Permit Application		Permit Application filed	April 24, 2001
Letter Requesting Additional Information	June 21, 2001	Supplemental BACT information, Modeling data, Emission calculations	August 22, 2001
Additional Information		Fluorides, lead, mercury,	Oct. 30, 2001
		Permit limitations	Nov. 30, 2001
		Acid Rain Application	Feb. 4, 2002
Permit Application was complete			Feb. 8, 2002

This project is considered a major stationary source since the emissions of particulates, PM_{10}, sulfur dioxide (SO_2), nitrogen oxides (NO_x), and carbon monoxide (CO) each exceed 100 tons/year. Also, there will be a significant emission increase in the emissions of mercury (Hg), beryllium (Be), and sulfuric acid mist (H_2SO_4). Therefore, the proposed construction is subject to a Prevention of Significant Deterioration (PSD) review for each of these pollutants. In addition, the boiler is subject to the New Source Performance Standards (NSPS) listed in Regulation 401 KAR 59:016, incorporating by reference 40 CFR 60, Subpart Da, for particulates, NO_X and SO_2 since the heat input is greater than 250 mmBTU/hour. Emissions of cadmium, chromium, copper, formaldehyde, manganese, and nickel, are subject to Regulation 401 KAR 63:020, Potentially hazardous matter or toxic substances.

For each pollutant subject to the PSD Regulation 401 KAR 51:017, a review of the following is required:

1. Demonstration of the application of Best Available Control Technology (BACT).
2. Demonstration of compliance with each applicable emission limitation under Title 401 KAR Chapters 50 to 65 and each applicable emissions standard and standard of performance under 40 CFR 60, 61, and 63.
3. Air quality impact analysis.
4. Class I area impact analysis.
5. Projected growth analysis.
6. Analysis of the effects on soils, vegetation and visibility.

The source is also subject to the case-by-case MACT requirements under Section 112(g) of the Clean Air Act, and has submitted a case-by-case MACT determination in accordance with the requirements of 40 CFR 63.43(e). A Notice of MACT approval is included in Section 8 of this Final Determination and Statement of Basis.

The Compliance Assurance Monitoring (CAM) provisions of 40 CFR 64.2 and 64.4 are applicable requirements for the source. Therefore, in accordance with 40 CFR 64, the applicant has submitted additional information on the monitoring plan for particulate matter (PM), particulate matter less than 10 micrometers in diameter (PM_{10}), sulfur dioxide (SO_2), and nitrogen oxides (NO_x). Specific elements of the CAM plan submitted by the applicant are discussed in Section 9.

3. EMISSION ANALYSIS

The proposed CFB Boiler project will consist of: one coal-fired atmospheric CFB boiler (nominally 270 MW) equipped with limestone injection, a dry lime scrubber, SNCR a baghouse, coal handling facilities to tie in with existing coal-handling units at the Spurlock Generating Station, limestone handling facilities, one cooling tower, a new coal pile, and ash handling facilities. For a detailed description of the plant processes and expected emissions at each emission point and emission unit, please see Section 2 of the application and the supplemental calculations submitted August 22, 2001. Please reference the application for hourly and annual emission rates and pollutant identification for each respective emissions unit. Emissions were based upon the maximum rated capacity of the facility, worst-case operating conditions, and 8760 hours of operating time for each operation after emission controls. The calculated potential emissions from the proposed project are summarized in the Table 1. Note that all particulate matter (PM) emissions are considered to be less than 10 microns in diameter (PM_{10}).

TABLE 1 - SUMMARY OF EMISSIONS

Pollutant	Proposed Potential Emissions (Tons/yr)	PSD Significant Emission Rates (Tons/yr)
Particulate (PM_{10})	164.3 (164.3)	25 (15)
Sulfur Dioxide	2190	40
Carbon Monoxide	2190	100
Nitrogen Oxides	766.5 - 1095	40
VOC	39.4	40
Sulfuric Acid Mist	54.75	7.0
Hydrogen Chloride	38.04	n/a
Beryllium	0.016	0.0004
Lead	0.069	0.6
Fluoride	0.51	3.0
Mercury	0.029	0.1

The potential emissions of PM/PM_{10}, SO_2, NO_x, CO, VOC, and H_2SO_4 mist from the boiler were obtained from the application and are based on design data from the manufacturer. The emissions from other sources were obtained either from design guarantees from the equipment manufacturer, or from published emission factors found in AP-42. Hazardous air pollutant (HAP) emissions from the boiler were calculated using the procedures specified in EPA-453/R-98-004b, Study of Hazardous Air Pollutants from Electric Utility Steam Generating Units – Final Report to Congress, Volume 2.

The following calculations represent the worst-case emissions scenario:

Calculations of Potential Emissions:

CFB Boiler Emission Calculations:

Example Calculation for NO_x Emissions
Proposed NO_x Emission Limit = 0.10 lb/mmBTU
Maximum Heat Input = 2500 mmBTU/hour

NO_x Emissions = 2500 mmBTU/hr * 0.10 lb/mmBTU = 250 lb/hr
250 lb/hr * 8760 hr/yr * ton/2000 lb = 1095 tons/year

All other criteria pollutant emissions were calculated in the same manner.

Uncontrolled SO_2 Emissions:
Maximum % S = 4.5 %
AP-42 Emission Factor = 31S lb/ton coal
Coal Input = 125 tons/hr

Maximum Uncontrolled SO_2 Emissions = 31(4.5)lb/ton * 125 tons/hr = 17,437.5 lb/hour
17,435 lb/hr * 8760 hr/yr * ton/2000 lb = 76,376.25 tons/year

Organic HAP Emissions:
Example Calculation for Acetaldehyde Emissions
Emission Factor = 6.75 lb/trillion BTU
Maximum Heat Input = 0.0025 trillion BTU/hr

Acetaldehyde Emissions = 0.0025 trillion BTU/hr * 6.75 lb/trillion BTU = 0.017 lb/hr
0.017 lb/hr * 8760 hr/yr * ton/2000 lb = 0.075 tons/year

Inorganic HAP Emissions:
Example Calculation for Antimony Emissions:
Coal Input Rate = 125 tons/hour = 1,095,000 tons/year

Concentration = 1.13 ppmw
Baghouse EMF = 0.02
Coal Cleaning Factor = 0.715

Emissions (tons/year) = Coal Input*(Conc/1,000,000)*Cleaning Factor*EMF
Antimony Emissions = 1,095,000 tons/yr*(1.13/1,000,000)*0.715*0.02 = 0.018 tons/year

Coal Crusher House Calculations:

Manufacturer's Guarantee = 0.1 lb/hour for PM

Annual PM Emissions = 0.1 lb/hr * 8760 hr/yr * ton/2000 lb = 0.44 tons/year

Coal Pile Unloading Calculations:

Emission Factor = 0.0003 lb/ton (avg. of BACT factors)
Maximum Throughput = 750 tons/hour

PM Emissions = 750 tons/hour * 0.0003 lb/ton = 0.225 lb/hr
0.225 lb/hr * 8760 hr/yr * ton/2000 lb = 0.99 tons/yr

Coal Silo Calculations:

Manufacturer's Guarantee = 0.1 lb/hour for PM

Annual PM Emissions = 0.1 lb/hr * 8760 hr/yr * ton/2000 lb = 0.44 tons/year

Coal Transfer Tower Calculations:

Emission Factor = 4.8×10^{-5} lb/ton (AP-42)
Maximum Throughput = 750 tons/hour

PM Emissions = 750 tons/hour * 0.000048 lb/ton = 0.036 lb/hr
0.036 lb/hr * 8760 hr/yr * ton/2000 lb = 0.16 tons/yr

Bed Ash Silo Calculations:

Manufacturer's Guarantee = 1.5 lb/hour for PM

Annual PM Emissions = 1.5 lb/hr * 8760 hr/yr * ton/2000 lb = 6.57 tons/year

Fly Ash Silo Calculations:

Manufacturer's Guarantee = 0.5 lb/hour for PM

Annual PM Emissions = 0.5 lb/hr * 8760 hr/yr * ton/2000 lb = 2.19 tons/year

Limestone Preparation Calculations:

Manufacturer's Guarantee = 0.1 lb/hour for PM

Annual PM Emissions = 0.1 lb/hr * 8760 hr/yr * ton/2000 lb = 0.44 tons/year

Limestone Silo Calculations:

Manufacturer's Guarantee = 0.02 gr/ACF
Exhaust Flow Rate = 5000 ACFM

PM Emissions = 5000 ACFM * 0.02 gr/ACF * lb/7000 gr * 60 minutes/hr = 0.86 lb/hr
0.86 lb/hr * 8760 hr/yr * ton/2000 lb = 3.75 tons/yr

Limestone Truck Unloading:

Emission Factor = 1.6×10^{-5} lb/ton (AP-42)
Maximum Throughput = 30 tons/hour

PM Emissions = 30 tons/hour * 0.000016 lb/ton = 0.00048 lb/hr
0.00048 lb/hr * 8760 hr/yr * ton/2000 lb = 0.0021 tons/yr

Cooling Tower Calculations:

Throughput Rate = 2262 gallons/minute
Dissolved Solids = 12,000 ppm
Drift Rate = 0.005 %
Density of Water = 8.345 lb/gallon

PM Emissions = 2262 gal/min * (12,000/1,000,000) *8.345 lb/gal* 0.000005 * 60 min/hr = 0.68 lb/hr
0.68 lb/hr * 8760 hr/yr * ton/2000 lb = 2.98 tons/year

4. REGULATORY REVIEW

This section presents a discussion on the air quality regulations applicable to this project. In some cases the emission limit or technology standard based on these regulations may be superseded by the BACT requirements which are more stringent under PSD (see Section 5, Best Available Control Technology Review); however, any specific testing, monitoring, record keeping, and reporting requirements contained in these regulations will still have to be met by the source in addition to any requirements under PSD.

The following regulations will apply to the proposed plant (please see the application for a detailed description of the plant and specific processes/units within the plant):

Regulation 401 KAR 59:016, incorporating by reference 40 CFR 60, Subpart Da, Standards of Performance for Steam Electric Generating Stations, for emissions units with a heat input at peak load equal to or greater than 250 MMBTU/hour for which construction commences after September 19, 1978, applies to the coal-fired CFB boiler. The proposed BACT is much less than the applicable standard for nitrogen oxides emissions in Subpart Da. The proposed facility permit allows a maximum emission limit of 0.07 lb/MMBTU heat input contingent upon a NO_x optimization study that may increase the limitation to a maximum of 0.1 lb/mmBTU. The NO_x optimization study will be completed by the permittee within 18 months of commencement of commercial operation. A NOx continuous emission monitor (CEM) will be installed to demonstrate compliance with the proposed limit. The permittee shall install, operate and optimize a Selective Non-Catalytic Reduction (SNCR) System for the reduction of NO_X emissions from the new CFB boiler.

Subpart Da standard for particulates is that no owner or operator shall emit more than 0.03 lb particulates/MM BTU heat input and 1% of uncontrolled emissions while burning coal. Proposed BACT for particulates is consistent with the EPA RACT/BACT/LAER Clearinghouse for coal CFBs which is emitting no more than 0.015 lb particulates/MM BTU heat input. Reduction of particulates is accomplished by installation of baghouse controls for particulates for the CFB units. A continuous opacity monitor (COM) will be installed on the new CFB boiler.

Subpart Da standard for sulfur dioxide is that no owner or operator shall emit more than 1.20 lb sulfur dioxide/MM BTU heat input and 10% of the uncontrolled sulfur dioxide emissions while burning coal. Proposed BACT for sulfur dioxide is consistent with the EPA RACT/BACT/LAER Clearinghouse for coal-fired CFBs that are emitting no more than 0.20 lb sulfur dioxide/MM BTU heat input based upon a 24-hour averaging time. Reduction of sulfur dioxide is accomplished by co-firing limestone in the feed to the CFB, augmented by dry lime scrubbing. A sulfur dioxide CEM will be installed at the CFB unit.

The permittee will have a continuous emission monitor (CEM) for measurement of CO emissions. The permittee will also operate a continuous emission monitor (CEM) for measurement oxygen or CO_2 as well.

The permit provides the appropriate monitoring, testing, reporting, and record keeping requirement of Subpart Da.

An initial performance test is required by Subpart Da for particulates, sulfur dioxide and nitrogen oxides. 40 CFR 60 Subpart Da refers to 40 CFR 60.8 for testing requirements. The source will perform an initial compliance test for particulates, sulfur dioxide and nitrogen oxides per Appendix A of 40 CFR 60. The source shall also perform compliance testing for carbon monoxide, volatile organic compounds, beryllium, mercury, lead, hydrogen chloride, and hydrogen fluoride.

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Acid Rain regulations, 40 CFR 72 through 40 CFR 78 apply. Part 75 requires continuous emission monitoring for NOx and sulfur dioxide.

Regulation 401 KAR 51:017 (40 CFR 52.21), Prevention of Significant Deterioration (PSD) of air quality, applies to the proposed CFB boiler which will be located at the existing Hugh L. Spurlock Generating Station in Mason County, which is currently designated as “attainment” or “unclassified” for all ambient quality standards. The proposed unit has the potential to emit more than 100 tons per year of one or more regulated criteria pollutants.

40 CFR 63, Subpart B, Requirements for Control Technology Determinations for Major Sources in Accordance With Clean Air Act Sections, Sections 112(g) and 112(j) ("Case by Case MACT") applies to the proposed new CFB Boiler.

Section 112(g) of the 1990 Clean Air Act Amendments (CAAA), requires certain new major sources of HAPs to implement maximum achievable control technology (MACT) standards. MACT standards are used to ensure a performance-based method for reducing toxic and HAP emissions. The control technology to be used to ensure maximum control is determined by establishing a MACT floor. The MACT floor for existing units is the average emission limitation achieved by the best performing 12% of existing sources. The floor for new sources can be no less stringent than the emission control achieved in practice by the best-controlled similar source.

Currently there are no finalized MACT standards for HAP emissions from coal fired electric utility steam generating units. However, in a notice of regulatory finding released in December 2000, the USEPA indicated that the development of regulations under Section 112 of the Clean Air Act for HAP emissions from this industry is warranted. The USEPA further indicated that the proposed emission standards for HAP emissions from coal fired electric utility steam generation units will be issued no later than December 2003 with promulgation of these standards no later than December 2004. Since no MACT standards have been established, the source as stated above must attain emission controls equal to or better than the best-controlled similar source.

The applicant has indicated that the HAP emissions limitations being proposed at the facility will be at least as stringent as the best-controlled existing similar source. KYDAQ concurs with the applicant's determination. Based on the control technologies being used at the facility and the data provided in the US EPA documents the proposed control technology and emission limits will meet or exceed the control levels at other sources. Based on the proposed control technologies and the reductions expected, the facility should meet or exceed the requirements for the best-controlled existing similar sources and therefore complies with all applicable MACT requirements. A Notice of MACT Approval is included in Section 8.

The Division has approved the monitoring proposed by the applicant for MACT compliance monitoring on the basis that the applicant has chosen parameters that are monitored on a continuous basis using CEM/COM data, along with the periodic fuel sampling. There are reporting, recordkeeping, testing, and QA/QC requirements that already apply to the CEMs/COMs that will be installed and operated for the new CFB Boiler exhaust. These requirements will assure that the continuous monitoring systems utilized by the applicant for compliance with the MACT limits will be operated and maintained at the level necessary for compliance monitoring.

The Compliance Assurance Monitoring (CAM) provisions of 40 CFR Part 64 apply to the new CFB Boiler. The Division has determined that regulation 40 CFR 64.2 and 64.4 are applicable requirements for the source. Therefore, the applicant has submitted a CAM plan as required by 40 CFR 64 prior commencement of operation. This CAM plan addresses the monitoring methods with averaging times and applicable QIP thresholds, recordkeeping requirements, and QA/QC for compliance assurance monitoring for emissions of PM_{10}, SO_2, and NO_x from the new CFB Boiler. SO_2 and NO_x will be monitored by Continuous Emissions Monitor (CEM), which will be used as the continuous compliance determination method to demonstrate BACT compliance, and to preclude the applicability of Regulation 40 CFR 64. Pursuant to 401 KAR 52:020 the plan shall receive public notice to ensure federal enforceability.

5. BEST AVAILABLE CONTROL TECHNOLOGY REVIEW

Pursuant to Regulation 401 KAR 51:017, Section 9(1) and (2), a major stationary source subject to a PSD review shall meet the following requirements,

(a) The proposed source shall apply the best available control technology (BACT) for each pollutant that it will have the potential to emit in significant amounts.

(b) The proposed source shall meet each applicable emissions limitation under Regulation 401 KAR 50 to 401 KAR 65, and each applicable emission standard and standard of performance under 40 CFR 60, 61, and 63.

The proposed source will be a major source resulting in emissions of nitrogen oxides, carbon monoxide, sulfur dioxide, particulate, PM_{10}, beryllium, and sulfuric acid mist that exceed the corresponding PSD net significant emission amounts. Therefore, each of these pollutants shall be subject to a BACT review.

East Kentucky Power Cooperative has presented, in the permit application, a study of the best available control technology for each pollutant and each emissions unit at the proposed source. The Division has reviewed the proposed control technology in conjunction with information available in the U.S. EPA's RACT/BACT/LAER Clearinghouse (RBLC) database and by U.S. EPA Region IV. A summary of the control technology determined to be the best available control technology for each pollutant and each emissions unit is presented on the following pages.

The permittee submitted a top-down Best Available Control Technology (BACT) analysis following the U.S. EPA guidance, "New Source Review Workshop Manual" (U.S. EPA, October 1990). The key steps involved with the top-down BACT process are as follows:

1. Identify all control technologies
2. Eliminate technically infeasible options
3. Rank remaining control technologies by control effectiveness
4. Evaluate most effective controls considering economic, environmental, and energy impacts, and document results
5. Select BACT.

A. BACT for Coal-Fired CFB

The following summarizes the BACT determinations for criteria pollutants from the proposed facility. Using the top-down approach, the applicant selected various technologies for analysis of technical and practical feasibility, and then applied economic cost effectiveness if the top ranked technology was not selected. The BACT requirements for the coal-fired CFB boiler are summarized below in Table 2. Table 3 presents a listing of the various technologies considered by the applicant in its BACT evaluation and presented to DAQ in the supplemental information dated August 22, 2001.

TABLE 2 - SUMMARY OF BACT REQUIREMENTS
For Coal-Fired CFB Boiler

EIS No.	Emissions Unit/Process	Pollutant	Best Available Control Technology	Emission Standard
08	Unit 3 CFB Boiler	NO_x	SNCR	0.07 lb/mmBTU (30-day average)
"	"	SO_2	Flyash dryer absorber (limestone injection) with dry lime scrubber	0.20 lb/mmBTU (24-hour average)
"	"	CO	Good Combustion Control	0.15 lb/mmBTU (30 day average)
"	"	PM/PM_{10}	Baghouse	0.015 lb/mmBTU (3-hour average)
"	"	Sulfuric Acid Mist	Limestone injection with dry lime scrubber	0.005 lb/mmBTU (30 day average)
"	"	Beryllium	Baghouse	0.0000146 lb/mmBTU (quarterly average)

Table 3

East Kentucky Power Cooperative
Proposed New CFB Boiler
Ranking of Control Technologies by Control Effectiveness

Pollutant	Control Alternative	Emissions tons/year	Emissions lb/hr	Emissions Reduction tons/year	Installed Capital Cost $	Total Annualized Cost $/year	Average Cost Effectiveness $/ton	Incremental Cost Effectiveness $/ton	Increase Over Baseline mmBTU/yr	Toxics Impact Yes/No	Adverse Environmental Impact Yes/No
PM10	Baghouse - 99+ % Efficiency	164.25	37.5	16260.75	20,500,000	11,200,000	689	n/a	n/a	No	No
	Uncontrolled Baseline	32850	7500								
SO2	Dry Lime Scrubber with with Limestone Injection Up to 97 % efficiency[1]	2190	500	74186	47,475,000	25,100,000	4607[2]	n/a	n/a	No	No
SO2	Uncontrolled Baseline	76376[3]	17437.5[3]								
NOx	SNCR - 0.07 lb/mmBTU	1095[4]	250[4]	1040.25	9,000,000	5,019,268	4825	n/a	n/a	No	No
NOx	SCR - 0.07 lb/mmBTU	766.5[4]	175[4]	1368.75	13,500,000	15,057,803	11001	30559	n/a	No	No
NOx	Uncontrolled Baseline	2190	500								
CO	No Control Alternatives										
VOC	No Control Alternatives										

[1] When combusting high-S coal (4.5 %)
[2] Incremental cost associated with add-on dry scrubber only, does not include limestone injection in boiler
[3] Calculated using a maximum S content of 4.5 %, AP-42 Chapter 1.1 emission factor.
[4] Uncontrolled emissions based upon AP-42 emission factor of 3.9 lb NOx/ton coal for CFB Boiler

NO_x

Control methods for NO_x can be divided into two types of control technologies: post-combustion controls and combustion controls. Post-combustion NO_x control removes NO_x from the exhaust gases from the boiler. Combustion NO_x control reduces the amount of NO_x that is generated.

The design of a CFB inherently is a combustion control for NOx. Since the applicant has proposed construction of a new CFB, combustion control of NOx has been committed.

Post-combustion NO_x control techniques were additionally considered to further control NOx. A CFB boiler designed for bituminous coal combustion is the ideal application for selective non-catalytic reduction (SNCR) in literature and practice. CFB boilers are constant temperature devices. The bed temperature and downstream flue gas temperature can be set by the operator to within a few degrees F. The typical temperature of CFB flue gas leaving the combustor is at the ideal temperature for SNCR. Additionally, the reduction reagent is injected at the inlet to the hot cyclone where all of the flue gas is swirled at 50-75 feet per second forcing changes in direction of the flue gas and reagent mixture several times. This cyclonic action homogenizes the reagent and flue gas NOx thus maximizing mixing.

The applicant has elected to utilize CFB boiler design with SNCR to reduce NOx emissions to levels below that required by recent EPA proposed regulations regarding ozone, and to meet NOx emission limitation comparable to recent BACT determinations.

Proper boiler design and operation is supported by recent determinations in the subset of the RBLC database that includes BACT determinations for CFB boilers. Considering these factors and the high cost of alternatives, proper boiler design and operation is deemed BACT for the EKPC CFB boiler in addition to the use of SNCR as a design feature of the CFB unit. EPA and RBLC data indicate a varying range of appropriate NOx emission limitations for CFBs equipped with SNCR. In another PSD permit issued in Iowa for a coal fired CFB, the NOx limit was 0.12 lb/MM BTU 30-day average, waived for the first 380 days after compliance demonstration, with an optimization study aimed at reducing NOx to 0.07 lb/MM BTU. Other RBLC PSD NOx limits for CFBs vary from 0.10 to 0.70 lb/MM BTU

In consideration of RBLC and data and inputs from the CFB design firm/vendor, the applicant is proposing that the NOx emission limitation be set at 0.07 lb/MM BTU heat input 30 day rolling average, with the requirement for the permittee to conduct and complete a NO_x optimization study that may optimize the NO_x limit up to no more than 0.10 lb/mmBTU.

CO

Carbon monoxide is formed as a result of incomplete combustion of fuel. East Kentucky Power's proposed CO BACT limitation is 0.15 lb/mmBTU. Boiler design and operation, along with combustion optimization through controls, will be the methodology for control of CO emissions from the CFB Boiler to BACT levels. The applicant reviewed information contained in the RBLC regarding coal-fired boilers. Of the 40 coal-fired boilers for which a BACT determination has been performed since 1991, all 40 list the control methodology as boiler design and operation and combustion control/optimization/efficiency, with no add-on controls for CO. 13 of the 40 facilities listed have lower CO limits than East Kentucky Power's proposed limit of 0.15 lb/mmBTU. However, only 4 of these 13 are circulating fluidized bed (CFB) coal-fired units, with listed BACT limits between 0.10 lb/mmBTU and 0.13 lb/mmBTU. Since the proposed BACT control methodology is identical to every other listed facility, the small differences in BACT limits can be attributed to individual differences in design and operation.

The Division also reviewed the EPA BACT/RACT/LAER Clearinghouse for coal-fired CFB boilers. The overwhelming majority of determinations specify good combustion practices/good combustion control and operation/proper design and in some cases no controls.

Considering the potential environmental, economic, and energy impacts associated with add-on control technology, the Division agrees with the permittee's elimination of alternate control technologies for CO emissions from CFB boilers. The DAQ therefore agrees that proper boiler design and operation is BACT for CO emissions.

SO_2

There are basically two types of SO_2 emission control configurations in coal-fired power plants. The first is the use of traditional pulverized coal boiler with add on controls for acid gas and SO_2 removal. Add-on controls typically consist of either a wet or dry scrubber. No acid or SO_2 removal is accomplished in the boiler itself. The second type of configuration is a CFB boiler where acid gases and SO_2 are removed in the boiler itself through limestone injection, referred to for this project as flyash dryer absorption. Further reduction in SO_2 emissions can be achieved through the use of an add-on dry lime scrubber. Control of SO_2 and acid gases is inherent to CFB operation, and the addition of a dry lime scrubber to allow both integrated and add-on control of SO_2 and acid gas emissions has been selected by the permittee as the chosen method of BACT control.

A baghouse has been determined to be BACT for PM_{10}. The baghouse also behaves as a control device for acid gases and SO_2, as additional SO_2 is removed as the gas passes through the lime dust filter cake. The activity of the removal mechanisms is greater at higher temperatures (i.e., in the boiler and preheater). In the baghouse, the activity of the reactions is low, but the gas is drawn through a filter cake composed almost completely of powder. Thus, even with the low reactivities in the baghouse, the intimate contact of the gas and powder provides additional acid gas and SO_2 removal.

Additional control could be added through the addition of a wet scrubber downstream of the baghouse. Wet scrubbing using a caustic agent such as pulverized limestone can achieve SO_2 removal efficiencies of 90 percent. When combined with the SO_2 removal of 95 percent, an overall removal efficiency of 99.5 percent could be obtained in theory. However, the costs associated with the use of a wet scrubber are excessive per ton of SO_2 removed, and the technology has not been required or demonstrated to be effective at low concentrations as would be found at the exhaust of the CFB baghouse. In addition, adverse environmental impacts of wet scrubbing are incurred in disposal of the used caustic mixture. Therefore, the combination of wet and dry scrubbing is eliminated from consideration as BACT.

Based on the foregoing discussions, and in consideration of sulfur input and coal quality, an emission limitation of 0.20 lb/MM BTU heat input is considered BACT for this type of boiler design and fuel use. The permittee has agreed to a 24-hour averaging time for the SO_2 emissions limit. Compliance with the 24-hour average ensures there will be compliance with the 30-day average required by 401 KAR 59:016. Since both averaging requirements are identical, it is mathematically impossible to go out of compliance on a 24-hour average without also going out of compliance on the 30-day average. Therefore compliance with both averages is assured by remaining in compliance with the 24-hour average. The control technology that is the most efficient at SO_2 and acid gas emission prevention is use of the CFB process with a dry lime scrubber and a baghouse. The CFB process with a flyash dryer absorber, dry lime scrubber and baghouse is chosen as BACT for SO_2 and acid gas control.

PM/ PM_{10}

Particulate emissions from coal combustion consist of inert materials in the coal, sulfates from fuel sulfur or mercaptans used as odorants, dust drawn in from the ambient air, particulate of carbon and hydrocarbons resulting from incomplete combustion, mineral matter in the water injected during diesel fuel firing, and condensables. Units firing fuels with low ash content and high combustion efficiency exhibit correspondingly low particulate emissions. Trace metals may be emitted from coal refuse combustion and are discussed in this section because these form a part of the particulate emissions.

A baghouse has the highest control efficiency of any of the particulate matter control options, and therefore, according to the “top-down” approach, must be considered first.

A baghouse removes pollutants and condensed metals (beryllium, lead and mercury) from the exhaust gas by drawing the dust-laden air and condensables through a bank of filter tubes suspended in a housing. A filter “cake”, composed of the removed particulate, builds up on the “dirty” side of the bag. Periodically, the cake is removed through physical mechanisms (e.g., a blast of compressed air from the “clean” side of the bag, shaking the bags, etc.) which cause the cake to fall. The dust is then collected in a hopper and eventually removed.

A baghouse is chosen as BACT for PM_{10} , fluorides, lead, mercury and beryllium control for the CFB boiler and for particulates from the material handling system for coal and limestone. This includes the emissions from the ash silos, limestone silos, and the coal crusher.

Compliance with the PM_{10} emission limits is assured when the pressure drop across a baghouse is within the manufacturer's specified optimum operating range. The permittee will check this pressure drop on a continuous basis through the use of a strip recorder or other continuous recording device. The permittee will also conduct daily visual observations of stacks for the CFB unit to check for opacity limit compliance. For the Coal and Ash handling systems, the permittee will perform weekly visual observations of the stacks. This is comparable to the reading frequency conducted at other coal-fired electric generating units and is sufficient to assure compliance.

In the case of limestone, fabric filters constitute BACT. For all conveyorized transfer, enclosure of the conveying system is deemed to be BACT for particulates. For raw limestone unloading, as well as coal storage, wet suppression is deemed to serve as BACT for control of particulate emissions.

In accordance with U.S. EPA guidance, the remaining PM_{10} control devices (ESP, wet scrubber, cyclone) are not considered further in the BACT analysis since the highest efficiency control device was selected as BACT.

Control of Non-Criteria Pollutants

The combustion of coal may release trace amounts of a number of non-criteria pollutants. Two of the PSD regulated pollutants (beryllium and sulfuric acid mist) require BACT analysis as defined by EPA. Emissions increases of fluoride, mercury, and lead are below the PSD significant levels, therefore no BACT is required for these pollutants.

For both pollutants the best available control technology is baghouse control. Condensation of heavy metals occurs in final stages of the dry scrubber and baghouse prior to exhaust, and the filter cake acts as a fine particle trap for the condensed metals. Sulfuric acid mist similarly is condensed in the dry scrubber and in the baghouse and adsorbs onto the filter cake. Another option is wet scrubbing. However, wet scrubbing is less effective and requires more water use and sludge disposal. BACT for metals emissions is use of a baghouse.

6. AIR QUALITY IMPACT ANALYSIS

Pursuant to Regulation 401 KAR 51:017, Section 12, an application for a PSD permit shall contain an analysis of ambient air quality impacts in the area that the proposed facility will affect for each pollutant that it will have the potential to emit in significant amounts as defined in Section 22 of the same regulation. The purpose of this analysis shall be to demonstrate that allowable emissions from the proposed source will not cause or contribute to air pollution in violation of:

(1) A national ambient air quality standard in an air quality control region; or

(2) An applicable maximum allowable increase over the baseline concentration in an area.

For pollutants for which no ambient air quality standard has been established, the analysis shall contain continuous air quality monitoring data gathered to determine if emissions of that pollutant will cause or contribute to a violation of the standard or a maximum allowable increase. The proposed facility will have potential emissions in excess of the significant net emission rates for nitrogen oxides, particulate/particulate-10, sulfur dioxide, volatile organic compounds, carbon monoxide, sulfuric acid mist, and beryllium.

A. Modeling Methodology

The application for the proposed source contains an air dispersion modeling analysis for criteria pollutants (nitrogen oxides, particulate/particulate-10, sulfur dioxide, and carbon monoxide) to determine the maximum ambient concentrations attributable to the proposed plant for each of these pollutants for comparison with:

1. The significant impact levels (SIL) found in 40 CFR 51.165 (b)(2).
2. The significant monitoring concentrations (SMC) found in Regulation 401 KAR 51:017, Section 24.
3. The PSD increments found in Regulation 401 KAR 51:017, Section 23.
4. The National Ambient Air Quality Standards (NAAQS) found in Regulation 401 KAR 53:010, ambient air quality standards.

All applicable air quality criteria are presented in Table 4. Based on the U.S. EPA suggested procedures, if the maximum predicted impacts for any pollutant are found to be below the SILs, then it is assumed that the proposed facility cannot cause or contribute to a violation of the PSD pollutant increments or the national ambient air quality standards (NAAQS). Therefore, no further modeling would be required for such a pollutant. The applicant may also be exempted from the ambient monitoring data requirements if the impacts are below the significant monitoring concentrations.

TABLE 4

Pollutant	Averaging Period	SIL (ug/m^3)	SMC (ug/m^3)	PSD Class II Increments (ug/m^3)	NAAQS (ug/m^3)
NO_x	Annual	1	14	25	100
PM_{10}	Annual	1	NA	17	50
	24-hour	5	10	30	150
SO_2	Annual	1	NA	20	80
	24-hour	5	13	91	365
	3-hour	25	NA	512	1300
CO	8-hour	500	575	NA	10000
	1-hour	2000	NA	NA	40000
Beryllium	24-hour	NA	0.001	NA	NA
CO	8-hour	500	575	NA	10000
	1-hour	2000	NA	NA	40000

The permittee used the Industrial Source Complex Short Term model (ISCST3) in the analysis. The ISCST3 model fulfills the requirements of Supplement C of the Guideline on Air Quality Models (Appendix W to 40 CFR 51). All of the parameters used in the modeling analysis for each pollutant appear satisfactory and consistent with the prescribed usage for this model. Per EPA guidance, the ISCST3 model was run with the regulatory default option in a sequential hourly mode using five consecutive years of meteorological data. Surface data and concurrent upper air data used were based on weather observations taken at the National Weather Service (NWS) station at the Cincinnati-Northern Kentucky airport from 1990 to 1994. Mixing height data for the years 1990 through 1994 were collected at Huntington, West Virginia. The typing scheme from the Land Use Procedure was used to classify the area as "rural". Terrain elevations were digitally entered by use of USGS 7.5-minute DEM files along with a terrain preprocessor that allows direct importation of the DEM data into the model data files.

B. Modeling results - Class II Area Impacts

The proposed CFB boiler will be located at the existing Hugh L. Spurlock Generating Station in Mason County, a Class II area. The permittee modeled the impact of the emissions from the proposed facilities on the ambient air quality and the results of the modeled impacts on the Class II area are presented in Table 5.

The modeling results show (Table 5) that the maximum impacts from the proposed facility for NO_x and CO are less than the EPA prescribed significant ambient impact levels (SIL). Modeled concentrations of NO_x, CO and beryllium are also below the significant monitoring concentrations (SMC) found in Regulation 401 KAR 51:017, Section 24. Modeling has demonstrated that the proposed facility will not cause or contribute to a violation of the PSD pollutant increments or the national ambient air quality standards (NAAQS) for NOx, CO, or

beryllium. Therefore, no further modeling is required at this time for these pollutants. The applicant is also exempted from the ambient monitoring data requirements since the impacts are shown to be below the SMC – for all relevant pollutants. The applicant has agreed to install and operate an ozone ambient monitoring station as a post-construction monitoring requirement in the permit.

The predicted sulfur dioxide impacts (both 24-hour and 3-hour) and PM_{10} impacts (24-hour) are greater than the SILs for these pollutants, thus, a "Full Impact Analysis" was developed for assessment of PM_{10} and SO_2 impacts.

TABLE 5

Pollutant	**Averaging Period**	**SIL** (ug/m^3)	**SMC** (ug/m^3)	**Max Impact of Emission** ($^{ug/m3}$)
NO_x	Annual	1	14	0.29
PM10	Annual	1	NA	0.83
	24-hour	5	10	8.35
SO_2	Annual	1	NA	0.59
	24-hour	5	13	11.91
	3-hour	25	NA	36.87
CO	8-hour	500	575	19.33
	1-hour	2000	NA	65.54
Beryllium	24-hour	NA	0.001	0.00087

The Full Impact Analysis consisted of:

- Determining compliance with the NAAQS, utilizing the proposed sources in conjunction with other significant existing interacting sources
- Evaluating compliance with the PSD Increment consumption limitation, assessing:
  - These sources alone
  - These sources in conjunction with the other significant existing interacting PSD sources

Significant Impact Areas (SIAs) were triggered for SO_2 and PM_{10} since some of the predicted impacts were above the applicable SILs. Table 4-3 of the application shows that the 3-hour SIA for SO_2 is a circle with a radius equal to 4.3 km, while Table 4-4 of the application shows that the 24-hour SIA for SO_2 is a circle with a radius equal to 13.6 km. Since the 24-hour SO_2 SIA was larger, the applicant elected to define the SIA as a circle with a radius of 13.6 km for all averaging periods. Table 4-5 of the application shows that the triggered SIA for PM_{10} is a circle with a radius equal to approximately 1.3 km.

A review of the Preliminary Analysis identified the geographical locations of the predicted highest short-term and annual averages using 1000 meter receptor grid spacing. To ensure that the maximum predicted impacts would be assessed, the model grid was then modified to achieve

100 meter spacing between receptor locations for the top 10 percent of the controlling impacts predicted at the 1000 meter receptor spacing. Interacting sources were added to the source database; the data was collected from county-by-county emissions inventories, which were provided by the Kentucky Division for Air Quality for those sources within the State of Kentucky, and by the Ohio EPA Division of Air Pollution Control for those sources within the State of Ohio. For the NAAQS evaluation, the "Carolina 20-D Procedure" was utilized to evaluate and screen all the SO_2 sources in all counties within 50 kilometers of the site. These sources are listed in Table 4-7 of the application for sources in Kentucky, and Table 4-8 of the application for sources in Ohio.

For the PSD Increment consumption analysis, the minor source baseline dates for PM_{10} and SO_2 were previously triggered in Mason County when Unit 2 was constructed at the East Kentucky Power Cooperative Spurlock Station. The PSD rules state that all sources of PM_{10} and SO_2 emissions that are within the applicable SIA, along with those sources of PM_{10} and SO_2 constructed after 1975 that have a potential to cause a significant impact on the project SIA, must be considered in the increment consumption analyses for both PM_{10} and SO_2.

For total impact analysis for comparison to the applicable NAAQS, all sources either within the applicable SIA or having a significant impact on the SIA were modeled. Tables 4-7 and 4-8 of the application list which sources are either in the applicable SIA or have the potential to cause a significant impact on the applicable SIA, and which of these sources also consume increment.

Representative background concentrations were obtained from air quality data collected from the Division for Air Quality monitor in Campbell County, Kentucky for PM_{10} emissions and from the ambient monitoring site operated by the state of Ohio in Clermont County, Ohio for SO_2 emissions. The applicant chose to use the maximum monitor values from these locations during calendar year 2000 for the background concentrations. While this procedure likely includes "double counting" impacts from point sources explicitly modeled for this project, the choice of the monitor maximum values assures conservative impact assessment.

Table 6 presents the results of the Class II increment consumption modeling performed by the applicant. All increment consuming sources determined to potentially have a significant impact within the applicable project SIA were modeled. As the results in Table 6 indicate, the impacts from this project indicate increment consumption values that are well within the PSD limits.

TABLE 6
Predicted Ambient Concentrations
Class II Increment Consumption Evaluation
All Interacting Sources

Pollutant	Averaging Period	PSD Increment, ug/m^3	Maximum 2nd-High Pollutant Impacts, ug/m^3	Year Predicted
SO_2	24-hour	91	31.48	1993
	3-hour	512	156.79	1994
PM_{10}	24-hour	30	14.12	1992

Table 7 shows the results of the applicant's modeling analysis of all sources of PM_{10} and SO_2 either within the applicable project SIA or determined to have the potential to cause a significant impact within the applicable project SIA. This table shows that none of the NAAQS for PM_{10} or SO_2 will be exceeded due to modeling all interacting sources and using the background concentrations listed in Section 4.6 of the application.

TABLE 7
Predicted Ambient Concentrations - NAAQS Evaluation
All Interacting Sources

Pollutant	NAAQS	Background Concentration, ug/m^3	Modeled Combined Source Impact, ug/m^3	Maximum Ground Level Concentration, ug/m^3
SO_2	365 – 24 hour 2nd high	119.3	221.12	340.42
	1300 – 3 hour 2nd high	177.6	1056.04	1233.64
PM_{10}	150 – 24 hour 2nd high	54	57.14	111.14

C. Modeling Results - Class I Area Impacts

The PSD regulations also require a demonstration that the proposed source's emissions would not adversely affect a Class I area's air quality related values (AQRV). The nearest federally designated Class I area to the project site is Mammoth Cave National Park in south-central Kentucky; it is approximately 250 kilometers to the Southwest of the Spurlock Station. The Great Smoky Mountains National Park, another designated Class I area, is approximately 325 km to the South of the Spurlock Station. Additionally, the prevailing winds in Kentucky are from

the Southwest direction. Based on the projected source emissions, the distance from the construction project and the prevailing wind direction, no adverse impact on a Class I area's air quality related values (AQRV) is projected. In order to assess whether any detailed Class I modeling analysis was required, the applicant consulted with the National Parks Service and utilized the guidance provided in the following documents:

- Federal Land Manager's Air Quality Related Values Workgroup (FLAG) Phase I Report
- Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Long Range Transport Impacts

Following the guidance provided by the NPS and in the above referenced documents, the applicant employed the CALPUFF modeling system in a "screening mode" to assess whether a detailed Class I analysis was required. Section 4.6 of the application describes the CALPUFF modeling procedures. This screening mode was employed using the most recent 5 years of surface meteorological data with extended records for humidity and solar radiation (SAMSON data). This data consisted of the SAMSON data from the Cincinnati-Northern Kentucky airport for calendar years 1986 – 1990. Upper air data utilized for the CALPUFF study was taken from the Huntington, West Virginia upper air station for the same calendar years. The screening receptor rings utilized in the CALPUFF modeling consisted of one receptor ring each for the Mammoth Cave and Smoky Mountains National Parks, with the source at the center of the ring and the distance between the source and the ring equal to the distance between the source and the closest property boundary. 360 receptors at 1 degree spacings were used for each grid.

CALPUFF modeling was conducted by the applicant for each year of meteorological data for both Class I areas. The CALPUFF post-processor, CALPOST, was then run to determine concentration impacts for SO_2 and NO_x, nitrate and sulfate deposition impacts, and impacts on visibility. Table 8 shows the results of the concentration modeling for the Mammoth Cave National Park and the Great Smoky Mountains National Park using the CALPUFF model. Table 8 shows that the only significant impact predicted by the CALPUFF modeling system occurred for the 24-hour averaging time for SO_2 impacts on Mammoth Cave National Park for three 24-hour periods out of the five years of modeled data. However, as the applicant describes in Section 4.7 of the application, the receptor location at which two of the three maximum concentrations were predicted is actually located on a portion of the ring outside the park boundaries. The applicant also indicates that the only significant impact that was predicted to occur inside the park boundaries is 0.240 ug/m^3, which is only 4.8 % of the available increment. Considering the distance between the source and the Class I area, the prevailing wind direction, and the fact that the vast majority of predicted impacts are well below the significant levels, the Division concurs with the applicant that no further analysis of Class I increment consumption on Mammoth Cave National Park is warranted. Also, since the impacts for all averaging times for the Smoky Mountains modeling are less than the significant levels, no further Class I analysis should be required at this location.

Table 8
Results of Class I Increment Modeling

Class I Area	Pollutant	Averaging Time	Maximum Impact, ug/m^3	Significant Level, ug/m^3
Mammoth Cave	SO_2	3-hour	0.55	1
	SO_2	24-hour	0.24	0.2
	SO_2	Annual	0.01	0.1
	NO_x	Annual	0.001	0.1
Smoky Mountains	SO_2	3-hour	0.58	1
	SO_2	24-hour	0.18	0.2
	SO_2	Annual	0.007	0.1
	NO_x	Annual	0.0008	0.1

Table 9 shows the results of the nitrate and sulfate deposition modeling conducted by the applicant for the Class I area impact determination. For the Mammoth Cave National Park modeling, specific guidance from the NPS and FLM suggested evaluating the percent change in deposition from existing deposition rates in the park, determined from actual SO_4 and NO_3 deposition modeling conducted within the park. No significance thresholds were listed to determine what level of change triggers a significant impact, however Table 9 shows that the overall maximum change in both S and N deposition will be insignificant (i.e. less than 0.1 % change). For assessing the CALPUFF screening modeling results with respect to S and N deposition in the Smoky Mountains National Park, guidance from the NPS and FLM suggested that the level above which a refined analysis may be required for S deposition is 0.005 kg/ha in the park, while the level above which a refined analysis may required for N deposition is 0.0014 kg/ha in the park. Table 10 shows that the maximum predicted S deposition for the Smoky Mountains is 0.0062 kg/ha, slightly above the screening threshold of 0.005 kg/ha. None of the predicted N deposition rates were above the screening threshold. Therefore, again given consideration to the distance between the source and the Class I areas, along with the prevailing wind direction, the Division concurs with the applicant that modeling has been sufficiently conducted such that no further deposition analysis for the Class I areas should be required.

Table 9
Class I Area S and N Deposition Modeling

Class I Area	Total S Deposition, kg/ha	S Deposition % Change	Total N Deposition, hg/ha	N Deposition % Change
Mammoth Cave	0.0067	0.085 %	0.0007	0.0002 %
Smoky Mountains	0.0062*	NA	0.0007	NA

* - Maximum S deposition was predicted on receptors that are NOT located within the park boundaries. The maximum S deposition predicted at receptor locations actually within the park boundaries is 0.0008 kg/ha.

7. ADDITIONAL IMPACTS ANALYSIS

A. Growth Analysis

The East Kentucky Power project will result in construction effects that are temporary and not cumulative with respect to operational effects. Since the proposed boiler will be constructed at an existing site with two operational coal-fired electric utility boilers, the total number of new employees will be insignificant with respect to area population. There should be no substantial increase in community growth, or need for additional infrastructure. The proposed project is also not expected to result in an increase in secondary emissions associated with non-project related activities. Thus, in accordance with PSD guidelines, the analysis of ambient air quality impacts need consider only emissions from the facility itself.

B. Soils and Vegetation Impacts Analysis

The project lies in an area of mainly agricultural use. No off-site impacts are expected to be of concern from the proposed action. Therefore, the potential for adverse impacts to either soils or vegetation is minimal. The criteria for evaluating impacts on soils and vegetation are taken from EPA's "A Screening Procedure for the Impacts of the Air Pollution Sources on Plants, Soils, and Animals" (EPA 1980). The results demonstrate maximum concentrations are well below sensitive levels. (This comparison includes ambient background levels.) The minimum impact level numbers in micrograms per cubic meters are not exceeded by the maximum impact concentration of the East Kentucky Power project for the pollutants sulfur dioxide, nitrogen dioxide, or carbon monoxide. Therefore, it is concluded that no adverse impacts will occur to sensitive vegetation, crops or soil systems as a result of operation of the proposed project.

C. Visibility Impairment Analysis

Visibility analysis was performed by the applicant using the CALPUFF modeling system in screening mode as described previously for the concentration and deposition analysis, and in Section 5.1 of the application. Guidance described by the applicant from the FLAG documentation suggests that the FLM will not object to issuance of a permit unless the model-predicted change in extinction, a measure of visibility impairment, is greater than 5.0 %. Table 5-1 of the application shows that, for the Mammoth Cave National Park CALPUFF visibility modeling, 5 days out of the five years modeled predicted changes in extinction that were greater than 5 %. Table 5-1 of the application also shows that the CALPUFF modeling for the Great Smoky Mountains National Park visibility assessment reveals 2 days out of the five years modeled with predicted changes in extinction greater than 5.0 %. Table 5-1 of the application shows that the maximum predicted change in extinction for receptors located in Mammoth Cave National Park is 4.59 %, while the maximum change in extinction for receptors located within the Smoky Mountains National Park is 3.82 %. The projected change in visibility associated with the operation of the proposed facility has been determined to be minimal.

The applicant also performed a visibility screening analysis using the EPA VISCREEN model for assessment of visibility impacts on sensitive Class II receptors. Given consideration to the Level 1 screening results, the distance between the proposed new source and the Class II receptors of

concern, and the prevailing wind direction, the Division concurs with the applicant that no further refined assessment of visibility impairment should be required.

D. Ozone

The Division does not anticipate violations of either the 1-hour or 8-hour ozone standard due to the construction of the new unit at the EKP Spurlock Generating Station based on the level of estimated emissions of nitrogen oxides and volatile organic compounds from the proposed facility and the amount of these pollutants currently being emitted to the atmosphere in the area. Additionally, the Division's USEPA-approved NO_x State Implementation Plan (SIP), and regulations approved to that SIP, will ensure substantial NO_x reductions in the area. Post-construction monitoring of ozone will be conducted by the source.

8. NOTICE OF MACT APPROVAL

The applicant has submitted a Case-by-Case MACT determination application in accordance with the requirements of Section 112(g) of the Clean Air Act. The Case-by-Case MACT determination was originally submitted with the PSD air permit application on April 24, 2001, with supplemental information submitted on May 31, 2002 at the request of the Division. The Division has determined that the Case-by-Case MACT determination submitted by the applicant is complete, and hereby approves the recommended MACT emission limitations as listed below:

HAP	**Emissions Limitation (lb/mmBTU)**
VOC	0.0036
Mercury	0.00000265
Hydrogen Chloride	0.0035
Hydrogen Fluoride	0.00047
Beryllium	0.0000146
Lead	0.0000063
Metal HAPS (as PM_{10})	0.015

In addition to the MACT limits listed above, the permittee shall also comply with all applicable requirements contained in 40 CFR 60, Subpart A.

The permittee shall be in compliance with all applicable requirements specified in the MACT determination upon startup of the new CFB Boiler.

Testing Requirements

Pursuant to 40 CFR 63.43(g)(2)(ii) case-by case MACT determination, and 40 CFR 70.6(c), the permittee shall demonstrate compliance with these emissions limitations within 60 days after achieving the maximum production rate at which the facility will be operated, but not later than 180 days after initial startup of the emissions unit.

During the initial compliance test, the permittee shall take a sample of the fuel "as fired" and analyze it to determine the HAP content in the fuel. This information shall be used to establish a correlation between the sample's HAP content and HAP emissions for monitoring purposes. The permittee shall demonstrate compliance with these emissions limits each year to validate the correlation between grab samples HAP content and HAP emissions.

Monitoring Requirements

Pursuant to 40 CFR 63.43 (g)(2)(ii), case-by-case MACT determination, 40 CFR 70.6(a)(3)(i)(B), and 40 CFR 64.6(c)(1), the permittee shall conduct the following monitoring to assure compliance with the applicable requirements:

HAP	Emissions Limitation	Monitoring Method
VOC (VOC HAPs)	0.0036 lb/mmBTU	The continuous compliance monitoring method used to assess compliance with the carbon monoxide emission limitation shall be used as an indicator of good combustion practices. Compliance with the carbon monoxide emission limitation assures compliance with the VOC (VOC HAP) emission limit.
Mercury	0.00000265 lb/mmBTU	The permittee shall take a sample of fuel "as fired" to the boiler on a quarterly basis. The samples taken on a quarterly basis shall be analyzed to determine mercury content. Emissions shall be estimated based on the emission correlations established during the most recent stack test. The continuous compliance monitoring method used to assess compliance with the PM emission limitations shall be used to assure compliance with the mercury emission limit as an indicator of proper operation and removal of mercury from the exhaust stream. The continuous compliance monitoring method used to assess compliance with the sulfur dioxide emission limitations shall also be used as an indicator or proper flash dryer absorber operational procedures. Compliance with the PM and sulfur dioxide emission limitations assures compliance with the mercury emission limit.
Hydrogen Chloride	0.0035 lb/mmBTU	The continuous compliance monitoring method used to assess compliance with the sulfur dioxide emission limitations shall be used to assure compliance with the hydrogen chloride emission limit. Compliance with the sulfur dioxide emission limitations assures compliance with the hydrogen chloride emissions limit.
Hydrogen Fluoride		The continuous compliance monitoring method used to assess compliance with the sulfur dioxide emission limitations shall be used to assure compliance with the hydrogen fluoride emission limit. Compliance with the sulfur dioxide emission limitations assures compliance with the hydrogen fluoride emissions limit.

HAP	Emissions Limitation	Monitoring Method
Beryllium		The permittee shall take a sample of fuel "as fired" to the coal-fired boiler on a quarterly basis. The samples taken on a quarterly basis shall be analyzed to determine beryllium. Emissions shall be estimated based on the emission correlations established during the most recent stack test. The continuous compliance monitoring method used to assess compliance with the PM emission limitations shall be used to assure compliance with the beryllium emission limit as an indicator of proper operation and removal of beryllium from the exhaust stream.
Lead		Same as beryllium
Metal HAPs		The continuous compliance monitoring method used to assess compliance with the PM emission limitations shall be used to assure compliance with the metal HAPs emission limit as an indicator of proper operation and removal of metal HAPs from the exhaust stream. Compliance with the PM emission limitation assures compliance with the metal HAPs emissions limit.

Recordkeeping Requirements

Pursuant to 40 CFR 63.43(g)(2)(ii) and 40 CFR 70.6(a)(3)(i)(B), the permittee shall keep quarterly records of the sample's HAP analyses. The permittee shall record continuously the SO_2 emission rate at the outlet of the flash dryer absorber using the CEM system.

The permittee shall record continuously the opacity of visual emissions at the outlet of the baghouse using the COM system. The permittee shall record continuously the carbon monoxide emission rate using the CEM system.

Reporting/Notification Requirements

Pursuant to 40 C.F.R. §64.9(a) the permittee shall report the following information according to the general reporting requirements specified in Section F.5. of this permit:

a. Number of exceedances or excursions;
b. Duration of each exceedance or excursion;
c. Cause of each exceedance or excursion;
d. Corrective actions taken on each exceedance or excursion;
e. Number of monitoring equipment downtime incidents;
f. Duration of each monitoring equipment downtime incident;
g. Cause of each monitoring equipment downtime incident;
h. Description of actions taken to implement a quality improvement plan and upon completion of the quality improvement plan, documentation that the plan was completed and reduced the likelihood of similar excursions or exceedances.

Section F of the proposed permit contains the requirement for annual certification of compliance in accordance with 401 KAR 52:020, Section 21 and 40 CFR 70.6c. This certification of compliance will apply to all permit terms and conditions, including those permit terms and conditions that apply to MACT.

MACT Control Technology

The following control technologies have been proposed by the applicant for maintaining compliance with the Case-by-Case MACT limits:

HAP	Control Technology
VOC (VOC HAPs)	Good combustion practices
Mercury	Selective non-catalytic reduction (SNCR), flash dryer absorber, baghouse
Beryllium, Lead	Baghouse
Acid Gases (Hydrogen Chloride and Hydrogen Fluoride)	Flash dryer absorber and baghouse
Metals (Metal HAPs)	Baghouse

Pursuant to 40 CFR 63.43(g)(2)(ii), case-by-case MACT determination, 40 CFR 70.6(a)(3)(i)(B), and 40 CFR 64.6(c)(2), the permittee shall monitor SO_2 emissions continuously using the CEM system. Compliance with the SO_2 emissions limitation assures proper operation of the flash dryer absorber. The permittee shall also maintain the opacity of visual emissions to less than 20 % as measured by the COM system. Compliance with the opacity limitation assures proper operation of the baghouse. The permittee shall also monitor CO emissions continuously using the CEM system. Compliance with the CO emissions limitation assures proper boiler operation and combustion control.

The Division has approved the proposed monitoring on the basis that the applicant has chosen parameters that are monitored on a continuous basis using CEM/COM data, along with the periodic fuel sampling. There are reporting, recordkeeping, testing, and QA/QC requirements that already apply to the CEMs/COMs that will be installed and operated for the new CFB Boiler exhaust. These requirements will assure that the continuous monitoring systems utilized by the applicant for compliance with the MACT limits will be operated and maintained at the level necessary for compliance monitoring.

9. COMPLIANCE ASSURANCE MONITORING

The Compliance Assurance Monitoring (CAM) provisions of 40 CFR Part 64 apply to the new CFB Boiler. The Division has determined that regulation 40 CFR 64.2 and 64.4 are applicable requirements for the source. Therefore, the applicant has submitted a CAM plan as required by 40 CFR 64 prior commencement of operation. This CAM plan addresses the monitoring methods with averaging times and applicable QIP thresholds, recordkeeping requirements, and QA/QC for compliance assurance monitoring for emissions of PM_{10}, SO_2, and NO_x from the new CFB Boiler. SO_2 and NO_x will be monitored by Continuous Emissions Monitor (CEM), which will be used as the continuous compliance determination method to demonstrate BACT compliance, and to preclude the applicability of Regulation 40 CFR 64. Pursuant to 401 KAR 52:020 the plan shall receive public notice to ensure federal enforceability.

Monitoring Approach

Applicable CAM Requirement	PM/PM_{10} limits
General Requirements	0.015 lb/MMBtu filterable particulates
	20% Opacity
Monitoring Methods and Location	Initial Source Test & (1) installation of a COM at outlet of the baghouse and monitoring of the baghouse pressure drop and other relevant parameters identified during initial testing or (2) visual observation of plume from stack
Indicator Range	(1) Initial source testing to establish COM and equipment parameter indicator ranges, including the baghouse pressure drop, as appropriate or (2) Initial source testing to establish compliance with the PM limit at 20% opacity. The permittee must conduct daily stack observations. If visible emissions are seen, the permittee must conduct a Method 9 observation to determine the opacity of the emissions or shall accept the concurrent read-out from the COM.
Data Collection Frequency	(1) Continuous COM and control device operating parameters or (2) daily observations
Averaging Period	(1)Opacity – 6 minute averages or (2) Visible Emission Surveys – 6 minutes
Recordkeeping	COM data system records and control device parameters will be maintained for a period of 5 years or visible observation records and method 9 observations will be kept in a designated logbook and maintained for a period of 5 years.
QA/QC	COM will be maintained and operated in accordance with 401KAR 59:005 / 40CFR 60 Appendix B and/or other requirements as applicable, baghouse monitored parameters will be maintained and operated in accordance with manufacturer recommendations; or records of Method 9 certifications will be maintained

Discussion of Monitoring Approach

EKPC is proposing a continuous opacity monitor (COM) as the CAM for PM and PM_{10} emissions. Selection of COMS as the indicator will provide an indirect but continuous method of assessment of compliance with the PM_{10} emissions limitation. The source believes that this is the most valid means of continuous monitoring for PM_{10} compliance assurance, since particulate matter CEMS have not been demonstrated to be viable for enough sources to warrant consideration. The source will be tested initially for PM_{10} emissions to provide a direct means for compliance evaluation.

Quality improvement plan thresholds are not currently being proposed for this CAM plan for PM_{10} since the NSPS COMS monitoring requirements provide the specific QA/QC procedures for data collection, substitution, and reporting.

10. CONCLUSION AND RECOMMENDATION

In conclusion, considering the information presented in the application, the Division has made a final determination that the proposed source should meet all applicable requirements:

1. All the emissions units are expected to meet the requirements of BACT for each significant pollutant. Additionally, each applicable emission limitation under 401 KAR Chapters 50 to 65 and each applicable emission standard and standard of performance under 40 CFR 60, 61, and 63 will also be met.
2. Ambient air quality impacts on Class II areas are expected to be below the significant impact levels. No significant impact is expected on any Class I area Air Quality Related Values (AQRVs).
3. Impacts on soil, vegetation, and visibility have been predicted to be minimal.

The Division has prepared a proposed permit containing conditions that should ensure compliance with all the applicable requirements listed above. The Division recommends the issuance of the permit following the proposed permit review period. A copy of this final determination will be made available for public review at the following locations:

1. Affected public at the Mason County Clerk's office.
2. Division for Air Quality, 803 Schenkel Lane, Frankfort.
3. Division for Air Quality, Ashland Regional Office, 3700 13th Street, Ashland, KY 41105-1507.

11. CREDIBLE EVIDENCE

This permit contains provisions that require specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.

ATTACHMENT A

FINAL PERMIT

ATTACHMENT B

RESPONSE TO COMMENTS

A. PRELIMINARY DETERMINATION AND STATEMENT OF BASIS

1. Additional Information Required in a Statement of Basis

Comment: The statement of basis (SB) should be revised to meet the intent of part 70 by containing a discussion on the monitoring and operational restriction provisions that are included for each emissions unit. 40 C.F.R. §70.6(a) requires that monitoring and operational requirements and limitations be included in the permit to assure compliance with all applicable requirements at the time of permit issuance. The selection of the specific monitoring procedures, including parametric monitoring and recordkeeping, and operational requirements must be explained in the SB.

The U.S. Environmental Protection Agency (EPA) Administrator's decision in response to the Fort James Camas Mill title V petition further supports this position. The decision is available on the Internet at: www.epa.gov/region07/programs/artd/air/title5/petitiondb/petitions/fort_james_decision1999.pdf. The Administrator stated that the rationale for the selected monitoring method must be clear and documented in the permit record.

The SB must include a discussion of streamlining determinations. When applicable requirements overlap or conflict, the permitting authority may choose to include in the permit the requirement that is determined to be most stringent or protective as detailed in EPA's "White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program" (March 5, 1996). The SB must explain why the Kentucky Division of Air Quality (KDAQ) concluded that compliance with the streamlined permit condition assures compliance with all the overlapping requirements.

Response: The Division has added the appropriate language to the Final Determination/Statement of Basis to address this issue.

2. Case-by-Case Maximum Achievable Control Technology (MACT) Requirements

Comment: This facility is affected by the "Notice of Regulatory Finding," 65 Fed. Reg. 79825 (Dec. 20, 2000). This notice listed electric utility steam generating units as a source category under section 112(c) of the Clean Air Act (CAA), 42 U.S.C. § 7412(c). Source categories listed pursuant to section 112(c) of the CAA, 42 U.S.C. § 7412(c), are required to comply with 40 C.F.R. part 63, subpart B, for construction or reconstruction of major sources of hazardous air pollutants (HAP) unless (1) the source has been specifically regulated or exempted from regulation and the owner and operator has fully complied with all procedures and requirements for preconstruction review; or (2) the permitting authority has made a final and effective case-by case determination.

In Section 3.3 of the application, EKPC provided a case-by-case MACT determination application (albeit an abbreviated one). KDAQ's preliminary determination/SB, however, does not indicate what control methods and levels have been determined to be MACT for this project. Moreover, MACT requirements have not been established in permit conditions. Before establishing MACT requirements, we recommend that KDAQ review EKPC's MACT determination application to make sure that all the applicable information submittal requirements of 40 C.F.R. § 63.43(e) have been satisfied.

Response: The Division has received additional information from EKPC for the Case-by-Case MACT determination in accordance with 40 C.F.R. 63.43(e).

3. Compliance Assurance Monitoring (CAM) Requirements

Comment: 40 C.F.R. § 64.5(a) requires the owner or operator to submit to the permitting authority a monitoring plan that satisfies the design requirements in 40 C.F.R. § 64.3 as part of the application for an initial title V permit for "large" pollutant specific emissions units (i.e., emissions units with potential to emit a regulated air pollutant in an amount equal to or greater than the title V major source threshold). A CAM submittal must be provided for particulate matter (PM), particulate matter less than 10 micrometers in diameter (PM10), sulfur dioxide (SO2), and nitrogen oxides (NOx) in accordance with 40 C.F.R. §§ 64.3 and 64.4. The approved monitoring must be included in the permit.

Response: The Division has received the source's CAM plan for PM, SO2, and NOx.

B. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

1. General Comments

Comment:

a. In general the BACT evaluation lacks detail, especially with regard to identification of other emission sources that might provide data for comparison with the applicant's proposed BACT methods and emissions rates. The only information reference that the applicant and KDAQ appear to have used (at least the only reference cited) is the EPA RACT/BACT/LAER Clearinghouse (RBLC). Although the RBLC is a valid starting point, it is by no means the only information source that should be considered. An example of a comparable project not mentioned by either the applicant or KDAQ is the Kentucky Mountain Power CFB project that has been permitted for construction and operation in Kentucky. Furthermore, at the time of preparing the preliminary determination, KDAQ had access to PSD permit applications for the following CFB projects in Kentucky: Kentucky Eastern Power, Kentucky Western Power, and Calla Energy. Another CFB project in the United States that could be assessed for comparison is the JEA Northside Repowering project (Florida). CFB projects in other countries are also eligible for consideration in a BACT evaluation. In summary, the evaluation of comparable projects has not been thorough enough.

Response: The Division has received additional information from EKPC that indicates the source has considered other sources in the BACT analysis, where appropriate, and has also received information from the equipment vendor, ALSTOM Power, Inc.

Comment:

b. In the permit application, the applicant refers to "guarantees" in several places for justification of proposed BACT levels. However, in FORM DEP7007N, the applicant lists control equipment manufacturer and model as "to be determined." It is not clear what the word "guarantee" means when vendors and specific equipment have not been selected. Similarly, KDAQ states on page 4 of the preliminary determination that potential emissions "are based on design data from the manufacturer." No manufacturer design data is provided in the application.

Response: The Division has received detailed information from the equipment vendor, ALSTOM Power, Inc.

2. Nitrogen Oxides BACT

Comment:

a. The applicant proposed the use of selective non-catalytic reduction (SNCR) as BACT for NOx emissions and did not acknowledge the possibility of using selective catalytic reduction (SCR) for

NOx control, or provide an explanation of why SCR should not be selected. Similarly, KDAQ does not mention SCR in the preliminary determination. The applicant for at least one other CFB project in Kentucky (Calla Energy) has proposed use of SCR rather than SNCR as BACT. Since SCR can typically result in better control compared to SNCR, the use of SCR should have been evaluated or an explanation provided as to why SCR is not feasible or is no more effective than SNCR. Further related to this point, KDAQ refers to the "high cost of alternatives" for NOx control. No identification of alternatives (such as SCR) and no cost data were included to support this statement.

Response: The Division has received additional information from EKPC regarding SCR, including revised cost data and technical concerns. The source has agreed to a 0.07 lb/mmBTU NO_x limit achieved through SNCR technology, contingent upon completion of a NO_x optimization study whereby the NO_x emissions may be optimized up to 0.10 lb/mmBTU if the study indicates that the 0.07 lb/mmBTU limit cannot be met.

Comment:

b. The applicant's proposed NOx BACT emissions level accepted by KDAQ is 0.10 lb/MMBtu averaged over 30 days. As acknowledged by the applicant, lower levels have been accepted for several other projects. In supporting its preliminary determination, KDAQ uses the phrase "In consideration of RBLC and data and inputs from the CFB design firm/vendor." As we previously discussed, the RBLC is not the only source of relevant information and does not include other CFB projects in Kentucky. Furthermore, there is no indication that a design firm/vendor had been selected, and no design firm/vendor data were included in the application or a vendor explanation as to why a lower emissions rate is not achievable. In summary, the explanations given to support a 30-day average emissions rate of 0.10 lb/MMBtu as BACT are inadequate. KDAQ should consider lower emissions levels for NOx before arriving at a final BACT determination. Consideration of lower levels is especially appropriate if a 30-day compliance averaging period is retained for NOx emissions. An averaging period this long could allow a lower average emissions level to be achieved even if much higher emissions rates occur for a short time.

Response: The NO_x BACT emission limitation has been reduced to 0.07 lb/mmBTU with a thirty (30) day averaging time. Like Kentucky Mountain Power, EKP will develop and implement a NO_x optimization study if they can demonstrate that the 0.07 lb/mmBTU is unachievable. Please refer to Section 4 of the Statement of Basis.

Comment:

c. In attempting to justify the proposed 0.10 lb/MMBtu as BACT despite lower emissions levels that have been permitted elsewhere, the applicant states on page 3- 10 of the permit application that "the difference in the chosen limits [between the Spurlock project and other projects] appears to be due to individual differences in design and operation." The applicant does not explain what these differences are, and it is unclear what they might be.

Response: See response to 2b., above.

3. Particulate Matter BACT

Comment:

a. The proposed CFB boiler BACT emissions limit for PM/PM10 of 0.03 lb/MMBtu appears to be too high. Other recent CFB boiler projects have been permitted with much lower PM/PM10 emissions rates. For example, the recently permitted Kentucky Mountain Power facility in

Kentucky has a CFB boiler PM/PM10 emissions limit of 0.015 lb/MMBtu; and this facility also has a dry SO2 scrubber which is cited by EKPC as one of the reasons why the Spurlock CFB boiler should have a higher emissions limit. KDAQ provides no explanation for the proposed BACT emissions limit in the preliminary determination. Furthermore, two of the reasons advanced by the applicant to support a higher emissions limit are not valid. One, the applicant states that selecting the most common control method currently accepted as BACT technology (a baghouse) means that the emissions level does not warrant further analysis. BACT is not just a control method but also the level of control achievable by this method. Two, the applicant refers to the estimated ambient air quality impacts of PM/PM10 as justification for the proposed BACT emissions rate. Under EPA policy, the relative ambient impacts of a pollutant under review in a BACT evaluation should be discounted so long as all of the BACT options under review can result in compliance with applicable ambient limits.

Response: Following review of baghouse performance, the source has proposed lowering the PM10 BACT emission limit from 0.030 lb/MMBTU to 0.015 lb/MMBTU. This limit, achieved through the use of a baghouse, will be equal to the BACT limit selected for the Kentucky Mountain Power project. This lower limit will not only satisfy the BACT requirements for PM10 emissions, but will also lower PM10 ambient air impacts significantly below those reflected in the revised air quality analysis presented in Attachment 3 to this document (which was performed with PM10 at 0.030 lb/mmBTU). Since the air quality analysis reveals compliance with all applicable ambient air limits for PM10 at a level of 0.030 lb/mmBTU, the margin of compliance will be increased by the new 0.015 lb/mmBTU limit.

Comment:

b. The BACT analysis does not address potential fugitive particulate matter emissions from additional truck traffic at the Spurlock Station due to additional limestone deliveries and ash transport.

Response: On-site generation of particulate matter associated with increased truck traffic will be negligible since the roadways through which these trucks will travel are paved. Paved roadways, along with dust mitigation practices in accordance with Kentucky regulation 401 KAR 63:010, will constitute BACT for control of any particulate generation due to additional truck traffic.

4. Sulfur Dioxide BACT

Comment: The BACT proposed for SO_2 by the applicant and accepted by KDAQ is a combination of limestone injection in the circulating fluidized bed and an add-on dry lime scrubbing device. Although this combination control method has the potential to be considered BACT, the control efficiency and resulting emission level (0.20 lb/MMBtu) proposed as BACT are of concern. The applicant states that the proposed method will achieve "at least" 95 percent removal of SO_2 based on "manufacturers guarantee." The applicant did not provide manufacturer data that could be used to evaluate this claim. In addition, the phrase "at least" implies that higher control efficiencies are achievable under some conditions, presumably when coal with higher sulfur content is burned. If the proposed SO_2 emissions limit applies to periods when highest sulfur coal is burned, then perhaps a lower emissions rate is more appropriate for BACT purposes. For comparison, the recently permitted Kentucky Mountain Power CFB facility is permitted with an SO_2 emissions limit of 0.13 lb/MMBtu, albeit for a fuel that differs from the fuel to be burned in the EKPC Spurlock CFB boiler. Further related to the BACT emissions level for SO_2, KDAQ has proposed a limit of 0.20 lb/MMBtu to be achieved over a thirty (30) day averaging period. An averaging period this long could allow a lower average emissions level to be achieved even if much higher emissions rates occur for a short time. We therefore recommend that KDAQ give further consideration to the proposed SO_2 emissions level before concluding that this level represents BACT.

Response: The proposed new CFB boiler at the source will be designed to combust coal with a sulfur content as high as 4.5 % at a heat value of 10,000 BTU/lb. Assuming that 5 % of the sulfur in the coal is absorbed in the ash, the estimated maximum uncontrolled emissions of SO_2 from the proposed new CFB are calculated as follows:

$$\frac{2500 \times 10^6\ BTU}{hr} \times \frac{lb\ coal}{10000\ BTU} \times \frac{0.045\ lb\ S}{lb\ coal} \times 0.95 \times \frac{1\ mol\ SO_2}{mol\ S} \times \frac{64\ lb\ SO_2}{mol\ SO_2} \times \frac{mol\ S}{32\ lb\ S} = 21{,}375\ \frac{lb\ SO_2}{hr}$$

Maximum controlled SO_2 emissions, using the proposed BACT limit of 0.20 lb/mmBTU, are 500 lb SO_2 per hour. Therefore, the control efficiency achieved by the system at this emission limit is calculated as follows:

$$\%\ Eff = 1 - \frac{500\ lb/hr}{21{,}375\ lb/hr} = 97.7\ \%$$

This calculation shows that, while the proposed emission limit is based upon the highest sulfur coal to potentially be combusted in the new CFB boiler, the percent removal is one of the highest, if not the highest, of any CFB boiler (based upon the RBLC database information and review of current pending applications in Kentucky). One application currently under review, the Thoroughbred Generating Station project in Kentucky, provides a limit of 0.167 lb/mmBTU at a removal efficiency of 98 % using similar sulfur content in the coal as EKPC. However, the new units will be pulverized coal boilers instead of CFB boilers, which ultimately prevents an adequate comparison for BACT purposes. The Kentucky Mountain Power Project, permitted in Kentucky in 2001, is a CFB boiler with a BACT limit for SO_2 of 0.13 lb/mmBTU, achieved through the use of limestone injection and dry scrubbing. However, this facility will be combusting coal refuse with a maximum sulfur content well below that being proposed for EKPC's new CFB boiler. Again, a comparison cannot be made for BACT purposes. Therefore, the level of SO_2 emission control achieved through the use of limestone injection and dry lime scrubbing is the highest ranking level of control for this type of unit, and the 0.20 lb/MMBTU proposed limit with a 24-hour averaging time should represent BACT on this basis.

The limit of 0.20 lb/MMBTU has since been accepted as BACT. The source has agreed to lower the averaging time from 30 days to 24 hours to address the additional concerns expressed by U.S. EPA.

C. AIR QUALITY IMPACT ANALYSIS

The following are our review comments on the air quality impact assessment provided in support of the proposed Spurlock CFB boiler project. Because model input/output electronic files were based on use of a boiler stack height greater than the good engineering practice (GEP) value, they were not included in our review. All table numbers and page numbers in the following comments refer to the permit application.

EPA Comments – Letter Dated March 26, 2002

1. GEP Stack Height

Comment: The GEP stack height evaluation appears to be in error. The "L" term should be the lesser dimension of the height or projected width of nearby structures. From the dimensions provided, the controlling structure's height of 260 feet is the appropriate value. Therefore, the GEP stack height is 650 feet not the indicated 725 feet. [Note: Table 4-1 indicates only 720 feet was used in the modeling.] The GEP stack height is the largest that can be used in the impact modeling.

Response: The calculated GEP stack height of 725 feet as presented in the application was the result of an incorrect calculation based upon a previously considered project scenario. The source has since corrected the GEP stack height to 650 feet. The source revised the air quality analysis to include the correct stack height for the new CFB Boiler and has submitted the documents to the Division and to U.S. EPA.

2. Complex Terrain

Comment: The application indicates terrain around the facility is higher than the height of the modeled 720-foot stack. The area of complex terrain is expected to increase when the correct GEP stack height of 650 feet is used. ISCST3 was properly indicated to be a simple terrain model (page 4-2). Therefore, an appropriate complex terrain model or procedure should be used if controlling concentrations are in complex terrain.

Response: The area of complex terrain does not increase due to the lower GEP stack height of 650 feet. Based upon a review of the nine quadrangle maps that encompass the modeling domain, along with a "double-check" of the elevations in the domain using Digital Elevation Models (DEMs) for the domain, 99.9 % of the terrain is below 1,190 feet, which corresponds to the stack elevation at a height above ground of 650 feet. Furthermore, the controlling impacts are within 5 km of the site, where no terrain features exceed 1,190 feet. Therefore, ISCST3 is the appropriate model for the stack height of 650 feet.

3. Sulfuric Acid Mist and Beryllium

Comment: Sulfuric acid mist and beryllium emissions were identified in excess of the PSD significant emission rates. The permit application includes modeled concentrations of these pollutants but does not provide an evaluation of the potential impact of these emissions (i.e., impacts on vegetation, soils, and visibility).

Response: The source modeled emissions of beryllium to determine whether a significant impact or the preconstruction monitoring requirement was triggered. The revised air quality analysis contained in Attachment 3 of EKP's response to EPA comments dated April 12, 2002, shows a maximum 24-hour beryllium impact of 0.00087 ug/m3 and a maximum annual impact of than 0.00004 ug/m3. PSD exempts a source from performing preconstruction monitoring for beryllium if the maximum 24-hour impact is less than 0.001 ug/m3. According to an ecotoxicological profile for ecological receptors for beryllium, U.S. EPA lists the average concentration of beryllium in air to be 0.00003 ug/m3 or 0.0003 ug/m3 in cities (ATSDR, 1993a). A maximum impact of less than three times the naturally occurring level of beryllium (for cities) is close enough to the naturally occurring value to state that there will be no adverse impacts on soils, vegetation, or visibility.

With respect to sulfuric acid mist emissions, no NAAQS exist for emissions of this pollutant. However, NAAQS do exist for SO_2 for protection of human health and welfare, including soils and vegetation. The modeling conducted for SO_2 indicates that none of the applicable NAAQS for SO_2 emissions will be exceeded. Since maximum emissions of sulfuric acid mist will be 40 times less than maximum emissions of SO_2 from the proposed new CFB, and no adverse impacts for SO_2 emissions were predicted to occur on vegetation, soils and visibility, a similar conclusion can be drawn for sulfuric acid mist emissions.

4. Ozone Impacts

Comment: NOx emissions are considered precursors to the formation of ground-level ozone. Neither the permit application nor KDAQ's preliminary determination includes a comment on the potential impact of NOx emissions on ambient ozone concentrations. Although we acknowledge that an EPA-approved localized dispersion model does not exist to estimate directly the impact of a single NOx source on ozone concentrations, we recommend that KDAQ provide a discussion of this issue.

Response: The source has agreed to install and operate an ambient monitoring station for ozone as a post-construction requirement to satisfy U.S. EPA's concerns. Discussion of the ozone issue has been added to the Statement of Basis.

5. Fluorides Impacts

Comment: Kentucky rules at 401 KAR 53:010 specify ambient air quality standards for gaseous fluorides (expressed as hydrogen fluoride) and total fluorides. The applicant did not provide modeling results to demonstrate compliance with these ambient standards.

Response: The source provided the Division and U.S. EPA with additional modeling for gaseous and total fluorides for comparison with the Kentucky ambient standards. The modeling indicates that worst case impacts of both gaseous and total fluorides are far below the applicable standards.

6. Impacts of Other Regulated Pollutants

Comment: As discussed in Section E. below, Kentucky rules specify that any emissions of a Clean Air Act regulated pollutant without a defined significant emissions rate causes that pollutant to be subject to PSD review. This would include the hazardous air pollutants in Table 2-2. Therefore, the potential impacts of at least some of the pollutants in Table 2-2 should be addressed.

Response: To satisfy U.S. EPA's concerns, the source conducted modeling to assess the impacts of beryllium, mercury, lead, and HCl and compared the worst-case predicted impacts to South Carolina's air toxic ambient limits as suggested by U.S. EPA. Worst-case impacts of these pollutants are well below the ambient limits.

7. Plant Layout and Site Boundary

Comment: A figure showing the important plant structures, emission points, through roads, right-of-ways, etc., should be provided. The site boundary and the area owned or controlled by EKPC with a barrier to the public should be identified as well as the plant components presented in Table 4-1.

Response: The source has agreed to provide the Division with one or more detailed site drawings that show more specific site information than the figures included in the application. The drawing will identify the site boundary, including the area restricted by a chain-link fence, and those areas on property that are considered ambient air, such as the railroads.

8. Modeled Receptor Grids

Comment: The EPA Guideline on Air Quality Models does not recommend 1,000-meter grid spacing for screening analysis. This grid resolution may be too coarse to allow the identification of the maximum concentrations for the significant impact area determination, and the location for refined 100-m grids for the national ambient air quality standards (NAAQS) and PSD increment compliance analyses. In addition, Figure 4-3 shows roads and a railroad line passing through the property, and a river as EKPC's northern property boundary. Because these are considered ambient air, confirmation is needed that the impact modeling included receptors on these features.

Response: To address the concerns expressed regarding the screening modeling receptor density, the source revised the air quality analysis. The new runs were conducted using a screening grid with a 500-meter resolution from the site boundaries out to a distance of 5 km. Additionally, refined modeling using 100-meter receptor grids was conducted not only around the receptor where the maximum screening impact was predicted, but also around all areas where impacts were predicted to be within 10 % of the maximum impact. Receptors were placed at all locations that are considered ambient air, including the roads, railroad line, and the river boundary.

9. Modeled Project Emissions

Comment: Table 4.1 identifies the plant components associated with the CFB boiler project. For those components that will experience an increased utilization, the increase in emissions (i.e., future potential less current actual emissions) were not provided. The basis for modeling some emissions as volume and area sources should be provided.

Response: Since the extent of the increase in utilization was unclear at the time of application submittal, source assumed that all existing material handling equipment at the site would experience a 100 % increase in utilization. In other words, all sources expected to experience an increase in utilization were modeled at their future potential rate without subtracting the current actual emissions. This procedure provides conservative impact estimation.

The conveyor transfer points and coal pile unloading emissions were modeled as volume sources since the emissions occur due to the motion of the material through the associated equipment, rather than from wind currents evolving dust from static areas. Cooling tower emissions were modeled as a volume source since the points of exhaust are too wide to be practically modeled as stack emission points, and the area source algorithm would not appropriately model the air flow from the cooling tower. Therefore, the volume source algorithm was chosen as the "best fit." The limestone unloading area, due to the size of the material, was modeled as an area source since most of the emissions would occur during unloading at ground level.

10. Worst Case Scenarios

Comment: The ambient impact modeling only considered full load operation of the CFB boiler. If operation at partial load is anticipated, this operational configuration should be included in the impact assessment.

Response: The source has stated it does not anticipate operation of the new CFB Boiler at partial load. Therefore, operation at maximum load with maximum allowable emissions constitutes worst-case.

11. Significant Impact Area (SIA)

Comment: As indicated above, the coarse receptor grid of 1-km spacing may not be sufficient to identify the maximum concentrations and the radius of the SIA. In addition:

> *a. Tables 4-3 and 4-4 are indicated to have the top 50 significant impact concentrations for 3-hour and 24-hour SO_2. Because these tables do not contain all concentrations greater than the significant impact levels (SIL), it may not be sufficient to identify the largest distance to a SIL concentration. Table 4-2 maximum SO_2 concentrations for each year and averaging period are not contained in Tables 4-3 and 4-4. Therefore, Tables 4-3 and 4-4 do not appear to contain the top 50 concentrations greater than the SIL.*
>
> *b. Table 4-5 is indicated to contain all concentrations equal to or greater than the SIL for PM10. Review of this table reveals the 1990 maximum concentration of 5.2 Fg/m3 is missing. Therefore, Table 4-5 appears not to contain all concentrations equal to or greater than the SIL.*

Response: As indicated in the response to Comment C.8, above, the revised modeling was conducted using a more dense receptor spacing for the screening modeling runs. Tables 4-3, 4-4, and 4-5 do not contain all significant impacts for PM10 and SO_2, because they present the greatest distances to the SIL concentrations and not a listing of all SIL concentrations. The tables are titled "Top 50 Impacts Sorted By Distance", with the maximum distance being the first in the list. Therefore, the data presented in the tables is sufficient to identify the largest distance to a SIL concentration.

12. Inventories of Other Emission Sources

Comment: The following are comments associated with the inventory of other emission sources considered for use in the cumulative NAAQS and PSD increment assessments.

> *a. Table 4-9 is indicated to contain all sources of SO2 within the SIA or that have a significant impact within the SIA. The following sources were identified to be included in the modeling (Table 4-7) but were missing from Table 4-9: Vicker Welco, Riverway Fertilizer, and Emerson Power Trans Corp.*
>
> *b. Table 4-10 is indicated to contain all sources within the SIA or that have a significant impact within the SIA. Bevins Sand & Gravel Inc. was identified (Table 4-7) to be included in the modeling but was missing from this table.*
>
> *c. The inventory of other emission sources should include applicable sources that have been permitted but not yet operating, and sources with a PSD permit application under review that pre-date the Spurlock CFB boiler project permit application. Confirmation is needed that such sources (if any) were included in the inventory.*

Response: The source has submitted revised modeling to include the "missing sources" mentioned in 12.a and 12.b, above. The tables have also been corrected to include these sources. With respect to Comment 12.c, other sources with PSD applications under review that pre-dated the Spurlock CFB project were considered, as documented in the August 22, 2001 letter from the source to the Division. None of these additional sources are close enough in proximity to the source to cause a significant impact in the area.

13. Class II Area Impacts

The following comments are associated with the Class II area PSD increment and NAAQS impact assessments:

> *a. Only the maximum coarse grid concentrations for each pollutant and averaging period were modeled to 100-m resolution. Refined 100-m resolution modeling should also be performed about coarse grid concentrations challenging (e.g., within about 10 percent of) the maximum concentrations.*
>
> *b. Table 4-6 presents the results of the refined grid modeling. Most of the maximum SO2 values in this table are identical (i.e., same concentration and receptor) to the maximum coarse grid values in Table 4-2. With the exception of 1990, the maximum PM10 refined concentrations are identical to Table 4-1 coarse grid values. Refined grid concentrations with such a small change from the coarse grid values are unusual. Confirmation is needed that the correct concentrations have been provided in these tables.*

Response: The source has submitted revised modeling using a refined 100-m resolution receptor grid constructed around all screening locations where impacts were predicted to be within 10 % of the maximum controlling impact. This revision answers Items 13.a and b, above.

14. Class I Area Impacts

Comment: The CALPUFF model was used in the screening mode to assess the impacts from the proposed project at Class I areas. This screening procedure requires a 360 degree ring of receptors at the nearest distance to a Class I area. The maximum concentration anywhere in the ring is compared to the appropriate significant impact level. For the screening assessment, it is not appropriate to eliminate from consideration concentrations for ring receptors not specifically within the Class I area. The screening modeling shows the 24?hour SO2 maximum concentration greater than the significant impact level at Mammoth Cave National Park, and the maximum sulfur deposition greater than the Great Smoky Mountains National Park screening threshold of 0.005 kg/ha. In terms of visibility, the change in extinction exceeded the threshold of 5.0% at both Class I areas. The federal land manager representative for these Class I areas should be provided the opportunity to review and comment on these analyses.

Response: While the Division acknowledges that the intent of the CALPUFF screening modeling is not to eliminate the concentrations for ring receptors not specifically within the Class I boundaries from consideration, the Division believes that the level of occurrences of impacts in excess of the screening thresholds are not significant to warrant a refined analysis. When the distance from the Class I areas along with prevailing wind direction is considered with the infrequency of the screening threshold exceedances, it is unlikely that a refined analysis would reveal any Class I impact exceedances due to the new CFB Boiler, and is therefore unwarranted. Since the revised air quality analysis submitted to the Division shows a minimal

increase in impacts of SO_2 and NOx due to modeling the stack height at 650 feet instead of 720 feet, no further Class I modeling using the CALPUFF model has been required. It should also be noted that other sources that are much closer in proximity to both Mammoth Cave and the Smoky Mountains with significantly more SO_2 and NOx emissions have been recently determined to have no adverse impact on either of these Class I areas. Information regarding this project has been provided to the Park Service. No comments have been received.

15. Additional Impact Analysis

Comment: The additional analysis requirement to assess visibility impacts at sensitive receptors within the Class II impact area was not addressed.

Response: The Division provided the source with a listing of sensitive Class II receptors and their locations. VISCREEN modeling for visibility assessment was performed to satisfy this issue. Based upon the VISCREEN modeling results, the Division has determined that the projected change in visibility associated with operation of the proposed facility is minimal.

D. PERMIT TERMS AND CONDITIONS

1. Missing Regulatory Authority for Each Term and Condition in Permit

Comment: 40 C.F.R. § 70.6(a)(1)(i) requires that the permit specify and reference the origin and authority for each term and condition. Please include the regulatory authority for each term and condition of the permit.

Response: The Division believes that the permit language specific to terms and conditions is sufficient in the current format, however, additional regulatory cites have been added to the permit. The Division believes that this comment is for Kentucky's Title V permit structure in general and should not be addressed in a discussion limited to the source's permit.

2. Operational Limitations - BACT Requirement

Comment: The permit does not require the installation of control devices for any of the affected emissions units with control devices selected to meet BACT requirements. The permit must require the installation of the control devices selected as BACT. Additionally, the permit must specify monitoring to assure compliance with the BACT requirements pursuant to 40 C.F.R. § 70.6(a)(3)(i)(B) and 40 C.F.R. § 70.6(c)(1).

Response: The permit has been revised to address this comment.

3. Emissions Limitations - Averaging Times for All Emissions Units

Comment: The thirty (30) day rolling average compliance times for SO_2 and CO are not adequate to ensure protection of all NAAQS and PSD increments. The NAAQS and PSD increments for SO_2 include ambient limits for averaging periods of 3 hours and 24 hours, and the NAAQS for CO are expressed in terms of 1-hour and 8-hour averaging periods. Therefore, compliance with the 30-day rolling average emission limits does not adequately demonstrate compliance with the short-term NAAQS or PSD increments. Consequently, to ensure protection of the NAAQS and PSD increments, enforceable short-term limits of 24 hours or less should be established in the permit for SO_2 and CO.

The permit does not contain any compliance averaging time for the other regulated pollutants (mercury, fluorides, etc.). Please include compliance average times for the other regulated pollutants and discuss how compliance with the emission limitations will be determined.

Response: The applicant has agreed to a 24-hour averaging time for the CFB boiler SO_2 emissions limitation. Averaging times have been added to the other regulated pollutants as have compliance determination methods.

4. Qualitative Visual Observations to Assure Compliance with Opacity Limitations for All Emissions Units

Comment: The permit requires qualitative visual observations to assure compliance with opacity limitations for several emissions units. These qualitative visual observations require that the opacity of emissions be determined by reference method 9 if the emissions from any stack during the qualitative visual observations are perceived or believed to exceed the applicable standard. This language is not practically enforceable as it leaves to interpretation what is perceived or believed to exceed the standard. Because the person performing the qualitative visual observation may not be a certified method 9 reader, it would be impossible for this person to determine if the emissions exceed the opacity standard. Consequently, the reference to perceived and believed must be replaced by language stating that if any visible emissions are seen, then the opacity must be determined using reference method 9.

Response: The "perceived and believed" language has been removed Additionally, the Division has received a CAM plan from the source that provides additional monitoring information for assurance of compliance with opacity limitations from the CFB Boiler.

5. Compliance Assurance for All Emissions Units

Comment: Pursuant to 40 C.F.R. § 70.6(c)(1), the statement of basis should include a section that explains how EKPC will assure compliance with all applicable requirements for each emissions unit. This explanation must include the rationale for the selection of the monitoring requirements for each applicable requirement.

Response: The Division has received a CAM plan from the source to address this issue and has included the provisions of the CAM plan in the Final Determination and Statement of Basis and in the permit.

6. Section B.2. Emissions Limitations - Missing Applicable Requirements for Emissions Unit 08

Comment: The source is subject to the requirements in 40 C.F.R. § 60.40.42a - 40.44a for particulate matter emissions, opacity, SO_2, CO and NO_x. When applicable requirements overlap or conflict, the permitting authority may choose to include in the permit the requirement that is determined to be most stringent or protective as detailed in EPA's "White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program" (March 5, 1996). However, the citations for all applicable requirements must be included in the permit.

Response: The CFR reference in the comment is incorrect. The correct reference is 40 CFR 60.42a – 60.44a. This cite is included under Applicable Requirements.

7. Section B.3. Testing for Emissions Unit 08

Comment:

a. The testing requirements in this section do not specify which pollutants EKPC must test to demonstrate compliance. For practical enforceability, the permit must specify which pollutants need to be tested and what reference method should be used to demonstrate compliance.

Comment:

b. Compliance must be assured for all regulated pollutants, including HAP. The frequency of the tests must be specified also. Specifically, for HAP, until a good correlation between the grab sample of the fuel and emissions is established, EKPC should conduct compliance emissions tests periodically, for example, every six months or every year to demonstrate compliance.

Response: The information requested is contained in Section D of the permit.

8. Particulate Matter Monitoring for the Coal-fired Boiler, Emissions Unit 08

Comment: The technologies for particulate matter (PM) continuous emission monitoring systems (CEMS) have become much better established. This is evidenced in part by the expectation that in the near future EPA will issue a final rule revision adding Performance Specification 11 (PS-11) to 40 C.F.R. part 60. PS-11 is entitled Procedures for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources. We therefore recommend that KDAQ consider adding a PM CEMS requirement for the proposed new coal-fired boiler.

Response: No performance specifications for a PM CEMS have been promulgated to date, therefore, adding this condition is not warranted.

9. Carbon Monoxide Monitoring for the Coal-fired Boiler, Emissions Unit 08

Comment: Pursuant to 40 C.F.R. § 70.6(a)(3)(i)(B) and 40 C.F.R. § 70.6(c)(1) the permit must contain monitoring sufficient to assure compliance with the applicable requirements. The permit does not specify any monitoring requirements for the carbon monoxide applicable requirements for the proposed new coal-fired boiler. We therefore recommend that KDAQ consider adding a carbon monoxide CEMS requirement for Emissions Unit 08.

Response: The source has agreed to install and operate a CEM for measurement of CO emissions from the new CFB Boiler. The appropriate language has been incorporated into the permit.

10. Section B.7.a. Specific Control Equipment Operating Conditions for Emissions Unit 08

Comment: This condition requires EKPC to operate the particulate matter control devices as necessary to maintain compliance with permitted emission limitations. This condition is vague and unenforceable. As required in 40 C.F.R. § 64.4, EKPC must provide a CAM submittal that would establish the control device parameters to record and ranges that will assure compliance with the applicable requirement. This condition must be replaced with the contents of the approved CAM submittal for particulate matter emissions.

Response: A CAM plan has been submitted by the applicant, and the contents of the approved CAM plan have been written into the permit.

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11. Applicable Requirements for Emissions Units 09 and 15

Comment:

a. The permit does not specify what BACT is for these emissions units. The permit must include in the permit emissions rate limitations based on air quality modeling and BACT requirements. Additionally, the permit must specify monitoring to assure compliance with the BACT requirements pursuant to 40 C.F.R. § 70.6(a)(3)(i)(B) and 40 C.F.R. § 70.6(c)(1).

Response: The permit description for Unit 09 has been updated to include the BACT controls for the use of wet suppression, telescopic chute, or dust suppressant, and the permit description for Unit 15 has been updated to include BACT controls for the use of dust suppressant or dust control measures. Monitoring requirements have been added.

Comment:

b. Regulation 401 KAR 63:010, Section 3 requires taking precautions to prevent fugitive particulate matter from becoming airborne. The permit must specify the precautions that EKPC will use to minimize fugitive particulate matter emissions. Additionally, the permit must contain monitoring to assure compliance with this applicable requirement pursuant to 40 C.F.R. § 70.6(a)(3)(i)(B) and 40 C.F.R. § 70.6(c)(1).

Response: For Item 11.b, the permit does contain language describing the precautions to be taken to minimize dust for Unit 09 in Section 7 of the permit for Unit 09, Specific Control Operating Conditions. Additional language has been added to both emission points sufficient to assure compliance with 401 KAR 63:010.

12. Specific Control Equipment Operating Conditions for Emissions Units 10, 11, 12, 13 and 14

Comment: The conditions in this section are vague and unenforceable. EKPC must determine the parameters to record and ranges that will assure compliance with the applicable requirements. The permit must include operating conditions and monitoring that will assure compliance with the applicable requirements pursuant to 40 C.F.R. § 70.6(a)(3)(i)(B) and 40 C.F.R. § 70.6(c)(1).

Response: The Division disagrees with this comment. Control equipment is required to be operated to maintain compliance with emission limitations contained in the permit. If emission limitations are exceeded this permit condition has been violated. Operating conditions and monitoring are contained elsewhere in the permit.

13. Applicable Requirements and Monitoring for Emissions Units 10, 11, 12, 13 and 14

Comment: The permit does not require the installation of control devices that were determined to be part of the BACT determination. The permit must require the installation of these control devices and include in the permit emissions rate limitations based on air quality modeling and BACT requirements. Additionally, the permit must specify monitoring to assure compliance with the BACT requirements pursuant to 40 C.F.R. § 70.6(a)(3)(i)(B) and 40 C.F.R. § 70.6(c)(1).

Response: The requirement to install BACT controls has been added to the permit. Operation of the control equipment in accordance with the manufacturer's specifications, performing qualitative visual observations, along with the prescribed recordkeeping as stated in the permit, will serve as the means to determine compliance.

14. Specific Record Keeping Requirements for Emissions Unit 16

Comment: The record keeping requirement specified in B.5.b. is vague and unenforceable. The permit must specify what information must be recorded (number of gallons of water circulated in a day, etc.).

Response: This language has been removed from the permit.

15. Section D - Emission Limitations and Testing Requirements

Comment: This section requires performance tests for certain pollutants and emissions units. However, the section does not specify when those tests must be performed. For practical enforceability purposes, this section should include a time frame indicating when these tests should be conducted and the frequency of testing.

Response: The timeframe for initial compliance testing is customarily contained in the General Conditions of the permit, specifically Section G.(d)5. This Condition, along with Condition 6, were inadvertently omitted from the draft permit. These Conditions are now contained in this permit. The division has the regulatory authority to request testing at any time.

16. Prohibition of Default Issuance of Title V Permits

Comment: 40 C.F.R. § 70.8(e) prohibits the issuance of a title V permit by default. Consequently, the proposed title V permit should not be signed and should not be allowed to become the final title V permit automatically after EPA's comment period is over. While the state may issue a title V permit when EPA has not objected within forty-five (45) days of receipt of the proposed title V permit and all necessary supporting information, the permit review and issuance process is confounded whenever EPA requires additional supporting information or does object within forty-five (45) days.

Response: The Division will issue the permit in accordance with the Commonwealth's approved Title V program.

17. Permit Expiration Language

Comment: In section G, general requirements, subsection b, the draft permit contains language that resembles title V expiration and permit renewal requirements. This permit is also a PSD permit and its requirements do not expire. We recommend the following language: Terms and conditions in this permit established pursuant to the construction authority of 401 KAR 51:017 or 401 KAR 51:052 shall not expire.

Response: This change has been made and is contained in Section G.(b)2.

E. PSD REVIEW FOR "OTHER" REGULATED POLLUTANTS

Comment: In the preliminary determination and statement of basis, KDAQ has not explicitly addressed compliance with Kentucky requirements in 401 KAR 51:017, Section 1(37)(b). This rule defines a significant emissions rate for PSD review purposes as any emissions of a pollutant regulated under the Clear Air Act that is not listed in Section 22. (Section 22 lists significant emissions rates for 19 specific pollutants or categories of pollutants.) Under Kentucky rules, for example, emissions of hydrochloric acid (specified in the Clean Air Act as a regulated hazardous air pollutant) from combustion of coal in the CFB

boiler is subject to PSD review requirements including a BACT determination and an evaluation of ambient impacts. KDAQ either needs to provide a justification prior to issuance of a final PSD permit as to why this rule is not applicable to the Spurlock Station CFB project, or a PSD review of the affected pollutants should be conducted prior to final PSD permit issuance. If KDAQ conducts a PSD review, we can assist in identifying the pollutants that can be the focus of this review.

Related to this discussion is the treatment of fluorides in the permit application and preliminary determination. Kentucky's rules in 401 FAR 51:017, Section 22 establish a PSD Significant emissions rate for "fluorides" of 3 tons per year (tpy). The applicant proposed, and KDAQ apparently agreed, that the only fluorides to be compared with the significant emissions rate are particulate fluorides. However, since Kentucky rules do not exclude hazardous air pollutants from PSD review, hydrogen fluoride emissions should be counted toward the 3-tpy significant emissions rate. Consistent with this opinion, the project is subject to PSD review for fluorides (with a total estimated fluorides emission rate of 29.1 tpy).

Response: The Division does not concur that Kentucky regulations require assessment of the "other" regulated pollutants not listed in Section 22 of 401 KAR 51:017. To require that analysis would render the Commonwealth's regulation more stringent than its federal counterpart. Based upon Kentucky Statute KRS 224.10-100, the Cabinet may issue regulations "which shall be no more stringent than federal requirements."

Furthermore, the HAPs that comprise the category referred to as the other regulated air pollutants are subject to the 112(g) case-by-case MACT provisions and has been addressed in the case-by-case MACT determination required by the Division. Therefore, the Division does not concur that gaseous fluoride emissions should be included along with particulate fluoride emissions and be subjected to PSD review. However, even if this determination was made, the source performed dispersion modeling for HF and total F emissions for comparison to the ambient standards in 401 KAR 53:010. HF is the only regulated air pollutant not listed in 401 KAR 51:017, Section 22, for which an ambient standard exists. The modeling, as documented in the revised air quality analysis included in Attachment 3 of EKP's response to EPA comments, dated April 12, 2002, reveals maximum ambient HF and total F concentrations that are below the ambient air quality standards.

F. EQUIPMENT DESCRIPTION

Comment: We are concerned about the lack of details provided in the application for various types of equipment, including emissions control equipment. As previously discussed in the BACT comments above, in Form DEP7007N where the applicant is asked to provide control equipment information, the only item of information given is a "To Be Determined" entry under manufacturer and model. No design details are provided to our knowledge that would allow the permitting authority to evaluate whether the control equipment can achieve the control levels proposed. For example, the applicant proposes use of a "dry lime scrubbing unit" for additional SO2 emissions control but provides no information on this unit. If KDAQ believes that a supportable permit can be issued without more detailed information, we recommend at a minimum that KDAQ require submittal of design details after final equipment selection has been made.

Response: The Division and U.S. EPA have received detailed equipment specifications as documented by the equipment vendor, ALSTOM Power, Inc.

G. EMISSION RATE ESTIMATES

EPA Comments – Letter Dated March 26, 2002

Comment: If not already done, KDAQ should review carefully the applicant's emission rate estimates to make sure they are appropriate. In general, the applicant calculated emissions using emission factors that are not demonstrated clearly as specifically appropriate for the proposed project. Two concerns on this point are as follows:

> • *The origin of several emission factors, for example, the 0.20 lb/MMBtu emission factor for SO_2, is stated to be "manufacturer's guarantee." However, to our knowledge, no manufacturers have been selected. If a selection has been made, the applicant did not provide a copy of the guarantees or discuss the operating conditions under which they apply.*
>
> • *The source of some emission factors in the application is an EPA publication identified as EPA-453/R-98-004b. Such publications are of necessity somewhat generic in nature and may or may not be appropriate for a specific project. Assessing the appropriateness of the data in this publication would require detailed coal analysis data and design data for the Spurlock Station PCB boiler and associated control equipment that were not available to us. Since the PCB boiler will burn coal already in use at the Spurlock Station, KDAQ may have access to detailed coal analysis data that could help in confirming that the emission factors used were appropriate. We specifically request that KDAQ obtain any data on the mercury content of coal now in use at the Spurlock Station and check the mercury emissions estimate with coal data.*

Related to this second concern, we generally would expect to see detailed coal analysis data in an application for a coal-fired emissions unit, especially a unit to be installed at an existing coal-fired steam electric generating facility. Such data typically would provide information on the ranges of coal characteristics such as sulfur content, heat content, ash content, trace element content, etc. The applicant states on page 3-10 of the permit application that the CFB boiler will have "the capability to fire both high and low-sulfur coal," but does not provide coal analysis data characterizing fuel variability except to state in Form DEP7007A the maximum ash content, maximum sulfur content, and the heat contents corresponding to these maxima.

As an additional point on emissions estimates, no consideration of fugitive particulate matter emissions from the new coal storage pile (apart from coal unloading) or from truck traffic associated with additional limestone delivery and ash removal was included in the information submitted for review.

Response: The Division and the U.S. EPA have received detailed vendor information documenting all guarantees for performance of the proposed air pollution control equipment. The HAP emissions calculations performed for this PSD application have been reviewed and they accurately represent maximum expected emissions from the proposed new CFB Boiler, including the mercury emissions estimate. The source has sought the flexibility to combust different types of coal, therefore the information currently available for coal used at the facility may not be relevant. Attachment 4 of EKP's response to EPA comments dated April 12, 2002, provides a listing of fuel analyses for three different types of coal to potentially be utilized in the new CFB Boiler. The source will submit additional relevant coal analytical data to the Division when available.

Regarding the additional point on emissions estimates, fugitive particulate matter emissions from the new coal storage pile were assumed to occur 24 hours per day, seven days per week from coal unloading. The unloading emissions are far greater than any fugitive emissions associated with dust generation from the coal pile due to wind currents, since the coal being stored in the coal pile will not yet have been crushed to size specifications. The Division believes that the worst-case particulate emission rate, both for the emissions estimates and for the modeling, has been correctly assessed. Off-site generation of particulate matter will be negligible since the

roadways through which these trucks will travel are paved. Paved roadways, along with dust mitigation practices in accordance with Kentucky regulation 401 KAR 63:010, will constitute BACT for control of any particulate generation due to additional truck traffic.

East Kentucky Power Cooperative, Inc.
Hugh L. Spurlock Generating Station
Proposed New CFB Boiler
Response to Comments from Mr. Stephen A. Loeschner

General Response:

The commenter presented the comments in a narrative format rather than an outline format, as did EPA in their letter containing comments regarding EKPC's proposed new CFB boiler. Therefore, instead of restating each specific comment and providing our response to each individual comment, we are addressing these comments in narrative form based upon each general issue raised by the commenter.

Meteorological Data:

The commenter raised concerns regarding the use of meteorological data in the modeling program. Specifically, the statements regarding the age of the meteorological data appears to be the main concern, since the commenter believes that April 1996 through March 2001 meteorological data would be more appropriate than the 1990 – 1994 meteorological data actually employed in the modeling program. At the time the modeling program began, which was several months before application submittal in April 2001, the 1990 – 1994 meteorological data set was the most recent available five years of complete (no occurrences of missing data) meteorological data available for the modeling program for the Covington/Greater Cincinnati meteorological surface data station and the Huntington, West Virginia upper air station. Given the high variability of meteorological conditions in an area from year to year, the statement that the old data must be viewed as being unlawfully representative has no basis. The commenter does not provide any details regarding why the 1990-1994 data is not representative. The Division believes that the modeling was performed correctly in accordance with Appendix W of 40 CFR Part 51, the Guideline on Air Quality Models.

SCR and Associated NH_3 Concerns

The commenter raised concerns regarding ammonia emissions due to utilization of SCR as the BACT control for NO_x emissions. EKPC did not propose the use of SCR for NO_x control, rather SNCR is the chosen method of BACT NO_x control. The Division maintains that ammonia is not a regulated air pollutant and that EKPC is not obligated to address ammonia emissions.

Beryllium

As the commenter points out, there is a discrepancy in the beryllium emission rate due to revisions performed by EKPC after submittal of the original application. The correct emission rate is 0.160 tons per year, corresponding to 14.6 lbs Be per trillion BTU. While the commenter is correct that the Be emission rate is approximately 400 times greater than the significant level for Be, the Division believes that the statement that "significance in regulation is related to human health harm ratios" holds no basis for assessing risk for this project. Air quality impacts are a much more reasonable tool for assessing risk levels than a comparison of an emission rate to a significance level without any consideration of dispersion parameters. A more likely statement

would be that the PSD de minimis levels (levels at which preconstruction monitoring is required) are more related to human health. It should be noted that the modeling performed for EKPC indicated Be impacts well less than the level at which preconstruction monitoring is required. Regarding the commenter's assertion that a complete Be BACT be performed, we do not concur since Be is a HAP and has been addressed in the case-by-case MACT submittal required by the Division.

Finally, the commenter provided extensive comments as to why the modeling conducted for Be emissions from EKPC's proposed new CFB boiler should be questioned, and that preconstruction monitoring should be mandated. The Division maintains that EKPC followed all procedures required for PSD modeling as documented in the Guideline on Air Quality Models without deviation, and the level at which preconstruction monitoring is required under PSD for Be was not approached or exceeded. Therefore, the modeling was performed correctly and no preconstruction monitoring for Be is required.

PM_{10}:

The commenter raises several issues regarding PM_{10}, including the BACT level of control chosen by EKPC and inclusion of condensable PM_{10} along with filterable PM_{10} to constitute total PM_{10}. The commenter also states that the permit should specify approved test methods, including Method 201, 201A and 202 of 40 CFR 51 Appendix M. The Division believes that EKPC's proposed level of control for PM_{10} emissions represents BACT for PM_{10} from the proposed new CFB boiler, and the air quality impacts predicted by the PSD modeling show values far below any levels of concern. The Division maintains that there are no regulatory requirements to include condensable PM_{10} in calculating total PM_{10} emissions, nor are there any regulations requiring EKPC to conduct testing using Method 201, 201A and 202 of 40 CFR 51, Appendix M.

NO_x BACT:

The commenter states several concerns regarding the BACT level of control chosen by EKPC for NO_x BACT, and states that "BACT for HSA cannot exceed TD BACT absent compelling environmental, cost, and all of the other required elements of consideration for BACT." The comparison to TD (Thoroughbred Generating Station PSD) not necessarily valid, since TD will construct pulverized coal units, while EKPC's proposed new boiler is an atmospheric circulating fluidized bed boiler. Also, TD will employ SCR for control of NO_x emissions, while EKPC will employ SNCR for BACT control of NO_x. The Division has reevaluated NO_x emission limits for circulating fluidized bed boilers and after consultation with EKPC, has lowered the NO_x emission limit to 0.07 lb/mmBTU, based on a thirty (30) day rolling average. Should that limit prove unachievable, the permit provides for an optimization study to determine the appropriate limit, not to exceed 0.1 lb/mmBTU. This approach is comparable to facilities permitted in other areas. The Division believes that the chosen level of control for NO_x does in fact represent BACT.

CO BACT:

The commenter again compares the level of emissions from EKPC's proposed new CFB boiler to the TD project with respect to CO. The Division asserts that the comparison is not

necessarily appropriate and the proposed level of BACT control for EKPC is valid and, in fact, is lower than other recently permit CFB units.

SO_2 BACT:
The commenter states that EKPC should provide the expected sulfur content of the fuel as fired such that removal efficiency can be calculated, and that DAQ should reduce the BACT emission limit to 0.12 lb/mmBTU. The removal efficiency calculation was performed by EKPC in the response to EPA comments, revealing a removal efficiency for SO_2 of 97.7 % when combusting coal at 4.5 % S. This represents the highest efficiency for any CFB boiler in EPA's RBLC database. Kentucky Mountain Power, which has been permitted to install two CFB boilers similar to that proposed by EKPC, has an SO_2 limit of 0.13 lb/mmBTU, however the boilers will combust coal with coal refuse that combined has a maximum S content of 2.5 % or less. The TD project states that a maximum of 98 % SO_2 removal can be attained at the BACT level of control of 0.167 lb/mmBTU, but again the Division maintains that a comparison with the TD project cannot be made due to inherent, basic boiler design differences. The Division has however, added a 24-hour average SO_2 emission limitation to the permit to enhance control of SO_2.

Hg:
The commenter states that a third control technique for reduction of Hg emissions from the proposed new CFB boiler should be applied to reduce the Hg emission rate from the proposed level of 2.65 lb/trillion BTU down to 1.40 lb/trillion BTU. There is no regulatory basis for this reduction, therefore the Division believes the original limit should stand.

CO Monitoring:
The commenter states that a CEM is reasonably required for CO. The Division has discussed this issue with EKPC, and EKPC has agreed to install and operate a CEM for CO emissions from the CFB Boiler.

Ozone:
The commenter states that "clearly the HSA VOC and NO_x emissions will *contribute* to violations of the 40 CFR 50.9 and 50.10 ground-level ozone NAAQS," and that EKPC should be required to apply under 42 USC 7501 *et. seq*. The effects of NO_x and VOC on ozone cannot be assessed from a single point source location. The Division has addressed this issue, and EKPC has agreed to install and operate an ozone ambient monitoring station as a post-construction monitoring requirement.

Testing:
The commenter suggests that more frequent stack testing be required for PM_{10} and VOC emissions, to the extent that four stack tests would be required per 365-day rolling period. The Division believes that emissions can be adequately evaluated through the use of the Continuous Emission Monitors. No regulatory requirements regarding testing at this frequency exist.

Chlorine:

The commenter raises concerns regarding chlorinated polycyclic compounds resulting from chlorine in the coal and limestone, and suggests that annual testing be required. EKPC's ultimate analyses of several different types of coal show less than 0.01 % chlorine by weight in the coal. No regulatory requirements for testing of chlorinated polycyclic compounds from coal-fired utility boilers exists. Therefore, the Division does not believe that any testing for these compounds should be required.